The Handbook for Revolt
Or
The Anarchist Cookbook:
Revised Edition

Preface

READ THIS FIRST / CAUTION

This is a work that contains information on topics of extreme potential danger. Many things which can lead to consequences some of which are wounding, burn marks, maiming, prosecution and jail time, even death. Not just for one self but for others that someone may care about.
It should never be understated the potential danger in trying to replicate the information covered in this work, related to firearms, munitions, flammables, explosives, poisons, criminal acts, etc.
Not taking the appropriate safety measures at all times will very likely result in harm or even death.

One should only try to actualize the content of this book after having read it very carefully, and while constantly making sure the safety measures are in place. Preferably having researched with other sources as well.
A good rule is to prepare safety measures such that even if the worst possible outcome were to occur it would not harm anyone.
So one should only practise once they know what they are doing, meaning they understand what they need to do and the risks involved, and that they prepare and are ready for the worst outcome always.

Many specifics and in-depth cautionary notes are prepared for the respective topic and these should be read as well before any attempts.
Further this work is best utilized by reading different parts and chapters in the order that they are relevant. Meaning it is not expected to read this cover to cover and try to master it all. Always start by reading the basics, and focus the effort on mastering one specific item at a time. There will be notes on other parts and chapters one should be familiar with before beginning the item.

The first chapter is about being anonymous, which is the chapter that should be read first, and is always important. Especially the parts regarding internet activity, as one should be able to research topics on their own without leaving unnecessary traces and evidence.
Thus there won't be notes everywhere stating one should try and be anonymous unless there's some special nuance or incentive to mention it.

It is only crime related parts of the book that will not have detailed discussion of risk. In regards to crime the danger is obvious. Compared to making explosives and there are more obscure chemistry facts to keep in mind. The danger is that one is caught and prosecuted, and since that is obvious, and the punishment varies a lot by state and country, I will not dwell on that particularly.

General measures of safety to keep in mind:
1 Always be prepared for the worst case situation.
Often this might involve using ventilation, fume hood, ballistic barrier, plastic or glass container bottom, plastic gloves and eyewear, dump bucket, ice baths, stand-off methods, etc.

When producing certain chemicals the fumes can be dangerous and are avoided by ventilation systems and fume hoods.
Another potential danger is spillage and against this one can place their working items in a plastic or glass container, so if there is spillage it falls in the container. And one can also have plastic gloves, eyewear and long sleeves to cover oneself, though make sure the clothing will not react with the working items. As it would between plastic gloves and nitric acid (nitric acid reacts with plastics).
A last general issue is carry away reactions, when working items spiral out of control, and usually there are signs for this like excessive fumes (which can be poisonous), bubbles, increase in volume and/or heat, change in colors, etc. And these can cause run-away reactions, which is a chain reaction usually causing excessive heat, fumes, increase in volume and can even detonate. Explosions are thus also a potentiality.
To avoid issues of run-away reactions and explosions, use ballistic or thick glass barriers, ice bath and also one can use a dump bucket.
The ballistic barrier is used while working or letting reactions take place, to protect the person.
Ice baths are a common method and involves preparing a bowl of water, ice and sometimes salt, and the working items and their container can be placed in the ice cold water to cool the items, usually making procedures more safe, with a thermometer one can control the temperature and if it rises uncontrollably one knows a run-away reaction will occur.
A dump bucket is a bucket full of water large enough to fit the working items and not spill over, if one suspects a run-away reaction or similar the person dumps the items in the bucket and quell the reaction with water.
A stand-off method is a method in which one allows and observes the reaction from a distance usually with a protective barrier in between. This is the highest level of protection, since even if a chemical would explode spontaneously and cause for example glass fragmentation, it would not harm the person.
An example of this is melting the explosive ETN to mix it with other compounds and one can control the temperature from a distance in safety, once the composition is prepared one can turn the heat off and let it cool and solidify which makes it more stable.

2 Start with small scale operations.
Only increase size and complexity with the operations as you grow familiarity.
I.E. Don’t start by trying a 1 kg batch of TEX (explosive).
Keep it manageable. Start with millie grams or 1 gram at a time. And remember never make more than 5 grams of primer explosives in one batch.

3 Research the topic yourself prior to attempting it.
Some of these issues are complex and still being researched by professionals, thus it is recommended to check prior to any attempt if there’s something worth considering. Depending on how accurate one wants to be in their performance.
If one feels the guide mentions rather than explains, it does tell the person what they are looking for.

4 Anonymous internet activity.
There’s an entire chapter devoted to staying anonymous or hidden. And some of this knowledge is not very useful in the beginning. But what is always useful in these modern times is anonymous internet activity. And one should start practising this right from the beginning.

To avoid being or if one is caught it helps alot if they suppressed “internet related” evidence, as it’s logged and accessible by authorities for a long time.
Therefore in the beginning it is expected the person will at least anonymize a lot of their internet activity so that their research on these topics becomes hidden. And one can then save the information on their computer, notebooks, etc.
Only increasing the anonymization depending on the operation being attempted and in that case the rest of the chapter becomes important.

5 Don’t talk.
Lastly, a huge reason why many criminals are caught is that they talk too much. They can’t help themselves because they don’t know what they are doing. Sometimes they brag because they like attention. And sometimes they offer information on interrogations or interviews because they think they can talk their way out of it. In fact in many police interviews they have some evidence to suspect you and only call an interview to have you be caught in lies or assert pressure before revealing what they know.
The simplest thing which will immediately increase the chances of success is to not volunteer information.
If friends ask, get used to denying or saying “I don’t know”. If police ask, get used to using your right to remain silent and ask for a lawyer. If you receive immunity and are forced to answer questions, say “I don’t know”.

LASTLY:
It is highly recommended you cross check information, especially on flammables, explosives, toxicants, biological weapons, as one should before attempting anything like that.

General Preface

This work is a study of utilizing force, both safe and dangerous, both legal and illegal, both formal and improvised.
The purpose of this work is to even the balance of power, by helping non-state actors with legitimate grievances, against potentially tyrannical and almost unrestricted states and institutions.
The method will be to guide people into an effective life of revolt, by providing structured and reliable information to perform said revolt.

As I cannot control the intentions of a reader I take no legal sense of responsibility for the actions of any potential reader.
Albeit I condone and support certain illegal activity and the targeting of certain people.

Almost all information collected is derived from the multitude of previous works of others in this area. This is such for several reasons:

1 It provides greater confidence in the accuracy of the information, that there's multiple sources, multiple attestation.
2 It provides a broad and in-depth review, by compiling the many different works often concerned with specifics.
3 It provides documentation and attention to many useful sources, by bringing attention to these sources they can be documented by a greater number of people.

This in effect is a meta-study or meta-analysis of utilizing force, with emphasis on improvised munitions, criminality and paramilitary tactics.
Though it is not restricted to the typical improvised munitions and tactics, as this meta-analysis or review is not restricted to the typical "handyman survivalist manuals", but will cover more formal sources like science literature and army field manuals.
Meaning there is much focus on improvised weapons and tactics, but not restricted to that, as formal weapons and tactics will be covered.

This review is aimed towards the individual or group seeking a beginner to advanced understanding of the topic. And the information will be useful for the petty criminal to paramilitary fighter.

For further reading and expert understanding, the sources will be listed for further study.

This should be considered a work for those who intellectually recognize the problems of the institutionalized systems and beliefs, and may or may not know how to start deconstructing these systems and beliefs.

It should also be understood that readers read the sources cited, or keep track of the sources being used, to assess how reliable the information is, rather than taking everything as equally reliable.

It is highly recommended you cross check information, especially on flammables, explosives, toxicants, biological weapons, as one should before attempting anything like that.

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[2] Code of Canon Law - Book Four - Chapter 3 https://www.vatican.va/archive/cod-iuris-canonici/eng/documents/cic_lib4-cann998-1165_en.html#CHAPTER%20III. 493
[3] “Making homemade body armor” Joemycheck1 https://www.youtube.com/shorts/7ZqYqK8awCI 493
[4] “How to make a stun gun with a capacitor” https://taserguide.com/how-to-make-a-stun-gun-with-a-capacitor/ 493
[5] “The ZIP Gun” https://thehomegunsmith.com/pdf/ZipGun.pdf 493
[6] “Hollywood V Reality: Steel Wool, Cotton Balls, and Expanding Foam. Don’t try this at home” https://www.youtube.com/shorts/APmaiXoWvfg 494
[7] “Do Oil Filter Silencers even work?” https://www.youtube.com/watch?v=b82a0wMGSTk 494
[8] “Solvent Trap Suppressors Dangerous?” https://www.youtube.com/watch?v=SxEIM8XiU8c 494
[9] “Thermites & Thermates” Dugan Ashley, 24 Jun 2025 https://www.youtube.com/watch?v=pnrA02ohqBg 494
[10] “Pentaerythritol tetranitrate”, 25 Jun 2025 https://en.wikipedia.org/wiki/Pentaerythritol_tetranitrate 494
[11] “TNT equivalent” 26 Jul 2025 https://en.wikipedia.org/wiki/TNT_equivalent 494
[12] “Advanced Explosive Design [p1]”, Dugan Ashley, 11 Jan 2024 https://www.youtube.com/watch?v=I_O-4M0_dsM 494
[13] “AED [p1]”, Dugan Ashley, 12 Jan 2024 https://www.youtube.com/watch?v=pnJlfCe_7Rg 494

[14] “Nickel(II) carbonate”, Wikipedia, 24 June 2025 https://en.wikipedia.org/wiki/Nickel(II)_carbonate 494
[15] “Aminoguanidinium bicarbonate”, Sciencemadness, 7 May 2021, https://www.sciencemadness.org/smwiki/index.php/Aminoguanidinium_bicarbonate 494
[16] “Sodium nitrite”, Wikipedia, 15 Aug 2025 https://en.wikipedia.org/wiki/Sodium_nitrite 494
[17] “Nitric Acid From Thin Air”, Cody’sLab, 10 Aug 2015 https://www.youtube.com/watch?v=ep23ds4cZs4 495
[18] “Making Nitric Acid From Air (DIY Birkeland-Eyde Reaction", DBX Labs, 2 Aug 2020 https://www.youtube.com/watch?v=4spP-L-RuGY 495
[19] “Ie Nitric Acid Still”, Dugan Ashley, 21 May 2025 https://www.youtube.com/watch?v=LB0dNvIbduA 495
[20] “Sulfuric Acid From A Car Battery”, Scrap Science, 18 Jan 2021 https://www.youtube.com/watch?v=wBUzGLEIIQw&list=WL&index=459 495
[21] “Purifying Sulfuric Acid Drain Cleaner”, NileRed, 17 Jan 2016 https://www.youtube.com/watch?v=4DUGRWjdNLI&list=WL&index=457 495
[22] “Make Sulfuric Acid (Copper Sulfate Electrochemical Method)”, NurdRage, 26 Dec 2009 https://www.youtube.com/watch?v=5dUSF9Gl0xE 495
[23] “Making Sulfuric Acid From Epsom Salt”, Scrap Science, 4 Nov 2018 https://www.youtube.com/watch?v=6BThiJpbBJQ 495
[24] “Making Sulphuric acid (Easiest way), Prussian Blue, 23 Dec 2022 https://www.youtube.com/watch?v=p7g4OyGuLV4 495
[25] “Making H2SO4 from Sulfates and HCL”, Chemical Engineering, 20 Dec 2020 https://www.youtube.com/watch?v=XWTuRMQE02I&list=WL&index=24 495
[26] “Make Hydrochloric Acid”, NurdRage, 2 Oct 2010 https://www.youtube.com/watch?v=YGjd7xxTuZw 495
[27] “Inorganic Chemistry”, Holleman-Wiberg, 2001, page 442 “https://books.google.se/books?redir_esc=y&hl=sv&id=Mtth5g59dEIC&q=hypochlorous+acid#v=snippet&q=hypochlorous%20acid&f=false 496
[28] “Acetic Anhydride from Vinegar: The Sulfur Chloride Route | OTC Acetic Anhydride Synthesis”, LabCoatz, 2 Jan 2023 https://www.youtube.com/watch?v=OrZ5Oa9K1R0 496
[29] “Preperation of ethanal (acetaldehyde) + Fehling’s test”, Astral Chemistry, 29 Dec 2016 https://www.youtube.com/watch?v=KBy_cjnMjpo 496
[30] “Turning Plastic Waste into Benzene”, jam_kemist, 17 Feb 2024 https://www.youtube.com/watch?v=ipq9GRFq8Eo 496
[31] “Diethyl Ether and Heptane from Starting Fluid | Obtaining Lab Solvents (episode 1)”, LabCoatz, 1 Jan 2022 https://www.youtube.com/watch?v=qmqBkr2MGi4 496
[32] “Extracting urea from my own pee”, NileRed, 3 Dec 2017 https://www.youtube.com/watch?v=sfldS5hqWYA 496
[33] “Direct synthesis of ammonia gas (Serpek Process)”, Astral Chemistry, 28 Jan 2017 https://www.youtube.com/watch?v=ZRFai58q1J8 496
[34] “Making anhydrous ammonia from urea and sodium hydroxide”, Thy Labs, 24 Aug 2021 https://www.youtube.com/watch?v=zbCpuEWLOww 496
[35] “Getting Guanidine Carbonate and Hydrochloride from No-Lye Hair Relaxants”, NurdRage, 26 Aug 2017, https://www.youtube.com/watch?v=wmWTF3lBDEI 496
[36] “Ammonium nitrate from store bought ammonia & air”, Darian Ballard, 5 March 2021,

https://www.youtube.com/watch?v=ueYvcbg69zg 496
[37] "The #1 Best Gorilla Explosive", Dugan Ashley, 5 May 2025, https://www.youtube.com/watch?v=TPBQnnKARbE 497
[38] "Guanidine nitrate synthesis from urea and ammonium nitrate (dihydrazino tetrazine DHT part 1)", NinjaChemist, 30 Mar 2025 https://www.youtube.com/watch?v=A6ppJo1VDpU 497
[39] "SADS [primary explosive]", Dugan Ashley, 19 Oct 2023 https://www.youtube.com/watch?v=R9rlhJrFmKc 497
[40] "ETN Overview [erythritol tetranitrate] p1", Dugan Ashley, 31 Jan 2024, https://odysee.com/@DuganAshley:e/ETN--erythritol-tetranitrate--p1:3 497
[41] "ETN part 2, synthesis, binary comps", Dugan Ashley, 28 May 2024, https://odysee.com/@DuganAshley:e/etn2:3 497
[42] "PETN", Dugan Ashley, 3 Oct 2024, https://odysee.com/@DuganAshley:e/1001:8 497
[43] "XPN xylitol pentanitrate #chemistry #science", Darian Ballard, 12 Feb 2024 https://www.youtube.com/watch?v=g5sLY9wrzms 497
[44] "Ethylene glycol dinitrate", Wikipedia, 13 Feb 2025, https://en.wikipedia.org/wiki/Ethylene_glycol_dinitrate 497
[45] "Making Hexamine", Apoptosis, 1 Sep 2023, https://www.youtube.com/watch?v=SYOze014tW0 497
[46] "How to make RDX, overview [part 1 of 2]", Dugan Ashley, 31 Jan 2024, https://odysee.com/@DuganAshley:e/RDX--part-1-of-2-:b 497
[47] "How to make RDX [part 2 of 2]", Dugan Ashley, 31 Jan 2024, https://odysee.com/@DuganAshley:e/RDX-Synthesis--part-2-of-2-:c 497
[48] "Hexamethylenetetramine Dinitrate (HDN): The Precursor for RDX Production by Bachmann Process", Turhan and co, 2013, https://www.wellesu.com/10.1002/prep.201200162 498
[49] "Explosives - Nitramines", GlobalSecurity, https://www.globalsecurity.org/military/systems/munitions/explosives-nitramines.htm 498
[50] "Preparative Chemistry review pieces & Bachmann (historical references", Thomas M. Klapötke, 2025, https://api.pageplace.de/preview/DT0400.9783111447087_A62621008/preview-9783111447087_A62621008.pdf 498
[51] "Hexamethylene triperoxide diamine", wikipedia, 10 Jun 2025, https://en.wikipedia.org/wiki/Hexamethylene_triperoxide_diamine 498
[52] "Density Functional Theory and X-ray Investigations of P- and M-Hexamethylene Triperoxide Diamine and Its Dialdehyde Derivative", Wierzbicki and co, 21 jun 2001, https://www.pismin.com/10.1021/jp0123841 498
[53] "R-SALT", Dugan Ashley, 9 Dec 2024, https://odysee.com/@DuganAshley:e/tmtn2:5 498
[54] "Nitrostarch Synthesis and Tests", Edward Tries, 28 May 2023, https://www.youtube.com/watch?v=oWUbduRo8Ns 498
[55] "TNT [Trinitrotoluene]", Dugan Ashley, 17 Nov 2023, https://www.youtube.com/watch?v=H0OI3hyjkFM 498
[56] "TNT Trinitrotoluenes and Mono- and Dinitrotoluenes: Their Manufacture and Properties.", G. Carlton Smith, 1918, https://dn790003.ca.archive.org/0/items/tnttrinitrotolue00smitrich/tnttrinitrotolue00smitrich.pd

f 498
[57] “Nitroguanidine aka [NQ]” Youtube, Dugan Ashley, 28 Sep 2023 https://www.youtube.com/watch?v=Wc2HzwOMIVE 498
[58] “Nitrouera”, A. W. Ingersoll and B. F. Armendt, 1925, https://www.orgsyn.org/demo.aspx?prep=cv1p0417 499
[59] “NITROMETHANE”, F. C. Whitmore and Marion G. Whitmore, 1923, https://www.orgsyn.org/demo.aspx?prep=cv1p0401 499
[60] “DIY Lead-Dioxide Electrode: Virtually free and Easy Method”, Blue Moonshine, 29 May 2024, https://www.youtube.com/watch?v=tzyUda3upHI 499
[61] “A Sodium Chlorate Cell”, Scrap Science, 10 Nov 2021, https://www.youtube.com/watch?v=N45DlWLQ218 499
[62] “Potassium Chlorate Synthesis Two Ways”, Apoptosis, 13 Jan 2024, https://www.youtube.com/watch?v=A1FxEg9MOag 499
[63] “A Potassium Chlorate Cell”, Scrap Science, 29 Jun 2021, https://www.youtube.com/watch?v=CqMEnrQb5q8 499
[64] “The Simplest (But Most Expensive) Perchlorate Cell”, Scrap Science, 9 Mar 2025 https://www.youtube.com/watch?v=cclQl6JeZOg 499
[65] “Lab Notes - Making Sodium Perchlorate Without Electrolysis, MIH0319, 18 Feb 2024, https://www.youtube.com/watch?v=BBjKIkzf9Tg 499
[66] “Perchlorate production via electrolysis, with PbO2 anode, Feanor Forges, 18 Apr 2021, https://www.youtube.com/watch?v=cxmuHoh7ObM&t=1s 499
[67] “Ammonium perchlorate synthesis”, Feanor Forges, 25 Jun 2021, https://www.youtube.com/watch?v=QvFt8myD7Gs 499
[68] “Transforming Table Salt into Rocket Fuel: Ammonium Perchlorate”, jam_kemist, 18 apr 2025 https://www.youtube.com/watch?v=gf1AoHq5Zjw 500
[69] “NAP [primary explosive]”, YouTube, Dugan Ashley, 18 Sep 2023, https://www.youtube.com/watch?v=Y0TJvbuF4yI 500
[70] “NAP Advancement”, Youtube, Dugan Ashley, 22 May 2024, https://www.youtube.com/watch?v=VR_9GZIIRRo 500
[71] “Hydrazine Sulfate”, Dugan Ashley, 5 Jun 2024, https://www.youtube.com/watch?v=SwFduB27qzo 500
[72] “Making Hydrazine Sulfate from Urea and Bleach”, Nilered, 19 Feb 2016, https://www.youtube.com/watch?v=PCovDr4FVNQ 500
[73] “Nickel Hydrazine Nitrate”, Apoptosis, 13 Jul 2023, https://www.youtube.com/watch?v=enJAVGGTPQ4 500
[74] “Tetrazene synthesis from Vinegar (and other chemicals), DBX Labs, 8 Jan 2020, https://www.youtube.com/watch?v=9YWmejywBHg 500
[75] “Making Tetrazoles ❙ One of the Most Nitrogen Containing Compounds”, Savinja Labs, 17 Jun 2025, https://www.youtube.com/watch?v=YpqeFap2s90 500
[76] Aakeröy, Christer B.; Wijethunga, Tharanga K.; Desper, John . (2015). Crystal Engineering of Energetic Materials: Co-crystals of Ethylenedinitramine (EDNA) with Modified Performance and Improved Chemical Stability. Chemistry - A European Journal, 21(31), 11029-11037. doi:10.1002/chem.201501721 500
[77] “LASL explosive property data”, Gibbs and Co, 1980, p 163-164, https://archive.org/details/LASL_Explosive_Property_Data/mode/2up 500
[78] “Insensitive explosive from urea. NTO, nitrotriazolone”, NinjaChemist, 2 Aug 2025,

https://www.youtube.com/watch?v=fHBqgnZDffY 501
[79] Maksimowski, P., & Gołofit, T. (2012). 4,10-Dinitro-2,6,8,12-tetraoxa-4,10-diazatetracyclo[5.5.0.05,903,11]dodecane Synthesis. Journal of Energetic Materials, 31(3), 224-237. https://doi.org/10.1080/07370652.2012.716490
Sci-hub link: https://www.pismin.com/10.1080/07370652.2012.716490 501
[80] “FM 5-250: Explosives and Demolitions”, 30 Jun 1999 https://ia601608.us.archive.org/5/items/military-field-manuals-and-guides/U.S.%20Army%20explosives%20and%20demolitions%20handbook%20%28%20PDFDrive%20%29.pdf 501
[81] “Detonators”, Dugan Ashley, 26 Aug 2024, https://odysee.com/@DuganAshley:e/detonators:4 501
[82] “Dug’s Detonator Secrets”, Dugan Ashley, 14 Apr 2025, https://odysee.com/@DuganAshley:e/dugsdetsecrets:2 501
[83] “FM 5-31: Boobytraps”, 1965, https://archive.org/details/milmanual-fm-5-31-booby-traps/mode/2up 501
[84] “TM 31-210: Improvised Munitions Handbook”, 2007 (edition), https://archive.org/details/usa-tm-31-210-improvised-munitions-handbook/mode/2up 501
[85] “A Review of Works on Shaped Charges”, Ahmed and co, 2017, https://etasr.com/index.php/ETASR/article/view/1532/625 501
[86] “A practical review study on shaped charge in the last two decades (2000-2020)”, Mehmannavaz and co, 2021, https://doi.org/10.1177/20414196211017923 or https://www.pismin.com/10.1177/20414196211017923
[“Kamarudin et al. (2016) investigated the penetration depth of a shaped charge with small geometry into steel targets… Copper liners with cone angles of 30°, 42°, and 60° were investigated. also, parameters such as case material and its thickness, and standoff distance were analyzed, as well. The best penetration depth in the steel layer obtained for a cone angle of 42° with a standoff distance of 2.5 CD, using the liner thickness of 0.5 mm.”] 502
[87] “Improvised Shaped Charges”, Desert Publications, https://dn710006.ca.archive.org/0/items/resistance_202309/ImprovisedShapedCharges_text.pdf 502
[88] “Ballistics 2011: 26th International Symposium”, chapter “Improvised Shaped Charges” on page 341, Baker and co, 2011, https://books.google.se/books?hl=sv&lr=&id=L9oaDntTOvwC&oi=fnd&pg=PA340&dq=shaped+charge&ots=qUlPVkafZI&sig=UF2BKLagmtHJ0_4YyFIMlNNYdTU&redir_esc=y#v=onepage&q=shaped%20charge&f=false 502
[89] “Preparing Potassium Cyanide - DO NOT ATTEMPT”, The Canadian Chemist, 11 Dec 2023, https://www.youtube.com/watch?v=UdoUQkzFvSg 502
[90] “HOW TO ISOLATE AMYGDALIN TO APRICOTS SEEDS. #ncchem”, NCCHEMISTRY, 13 Jan 2023, https://www.youtube.com/watch?v=swYeDieRda8 502
[91] “How to Make Chloroform”, TheChemistryShack, 13 Sep 2016, https://www.youtube.com/watch?v=7ilKvNmPDy8&t=29s 503
[92] “Making a Hypnotic Sedative from Acetone”, Apoptosis, 15 Jun 2024, https://www.youtube.com/watch?v=fXIlkGNRcPE 503
[93] “Making an old hypnotic sedative and preservative”, NileRed, 17 Jun 2017, https://www.youtube.com/watch?v=TzbkRC3rYEo 503
[94] “Synthesis of chloral hydrate (OTC)”, Hazel Chem, 30 Dec 2017,

https://www.youtube.com/watch?v=LnwuKRMGyh4 503
[95] “CIA Field-Expedient Key Casting Manual”, 1988, https://ia600108.us.archive.org/34/items/CIAFieldExpedientKeyCastingManual/CIA%20-%20Field-Expedient%20Key%20Casting%20Manual_text.pdf 503
[96] VaultCracker36 https://www.youtube.com/@VaultCracker36/videos 503
[97] “How easy it is for the Kia Boys to steal a car”, https://www.youtube.com/shorts/acO1C8xH2T8 503
[98] “A Study of Assassination”, CIA, 1953, https://ia601000.us.archive.org/29/items/CIAAStudyOfAssassination1953/CIA%20-%20A%20Study%20of%20Assassination%20%281953%29.pdf 503
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[1] Navy Seals Workout 504
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Where To Get Started and Educated:
Acquiring Knowledge, Information and Experience

Introduction

Where to get started?
The becoming and life of rebellion requires great dedication and involves a lot of risk..
It is the attempt to match the state in strength, which might seem like an impossible feat at first. Considering the manpower, dedication, resources, information and structure that the state has at its disposal.

To begin it is important to remember that the closest thing that corresponds to a state is the congregation of ruling members. Like a parliament. This is the body which claims authority over a nation and is successful, not because of its own power, but of the institutions who recognize it and surrender to it.
In this way the actual power of the state which is great, is not residing in the state. The state works like the brain of a body, while all the force comes from the muscles it controls.
This is the reason why many democracies fail to listen to the people. The state has the incentive to obey the institutions providing its power. And a democracy which chooses its leading members by vote will forever have this problem, any elected government will stand in dependency of institutions to actualize their political goals. Even if people stop voting for that particular party the next one elected will just do the same.
In fact this applies to all forms of government. How does the government rule and make the correct decisions if their power to enact decisions comes from institutions.
Institutions like the police force, the army, state media, public schools, etc. The public sector.
Part of the reason state societies took over in the first place is that they work better than anarchic societies. Meaning having a thinking body works better.
So institutions (acting body) want a state (thinking body) and the state wants institutions. Very naturally because both are to some degree dependent on each other, they can negotiate and compromise with each other. So that there's sometimes gain for individual institutions and sometimes the state can make decisions best for the nation.

And that's typically what happens in history whenever a new state forms, there's negotiations between state and institutions on how to organize society.
There's still one problem and that is the state is still a lot more dependent on the institutions than the institutions depend on the state. So ultimately to convince institutions/society to trust and follow a state there needs to be some justification, some motivation.
Prior in history we had the church and objective morality which everyone was expected to honour, and in that way you could centralize a lot of power and responsibility into a small or even singular entity, like a person, a monarch, or a monarch and council. And it worked because the state obeyed God, and the institutions and people wanted to do so as well, so they obeyed their God chosen king.
Basically the only way to create motivation and justification into trusting the state was by honour systems or legitimacy systems. Meaning there's some rules or principles the state is expected to follow which legitimize it, and if these rules or principles reflected something that everyone in society cared about, than everyone would have no objection to pitching into the state idea.

As Nietzsche predicted, people decided to kill God and the working principles for society for no reason. So many attempts to make a secular replacement for religion were made. The best being the "social contract".
This idea is that the state can with the power of institutions provide security, and if it does so then it can legitimately wield such power.
Basically everyone agrees the state has authority to wield power, effectively giving the state power, by getting security in exchange.
And many anarchists or freedom fans don't like the idea that at birth there's an unwritten agreement that you will voluntarily surrender to the state in exchange to get basic security.
Though this idea is good and would work harmonizably with the old system of religion and monarchy as well. The advantage of religion is that it is more real and binding on all.
The only problem of the social contract is that not everyone is in need of security, the holders of power in society or those of foreign influence are more independent.
For example a billionaire of a tech company might not feel a big need to provide to his nation or state if he can just move with all of his assets. Or dual citizens like immigrants.

So at the current time some states have been able to build the tradition of the social contract. Whereby people are indoctrinated into trusting the state and honour the system because it provides security.
This is particularly true for states with more reasonable requirements for citizenship and those that haven't embraced capitalism particularly long.
As we can see many western countries, like the USA and those in western europe, have had massive immigration, and created a global elite of billionaires. And naturally these states seem more dysfunctional. They pander to the interests of non-native people and billionaires or industry leaders, as they have some power and influence on society and they are not necessarily dependent on the nation or state.
A good example is the billion dollar media corporations who shun and demonize any problematic politician, or group voicing dissent to the system. And of course there's some effect, for many people their only interaction with a resistance group may be via media organisations. And these organisations are run by billionaires who could not care less about the interest of the people.

Another good example is when a sitting president of the United States is executed, of course a common theory is that the intelligence agency isn't happy with the negotiations and simply kills the president, since the power comes from them, not the presidency itself.
Or examples like “Operation Northwood” or “Operation MKUltra” or the scandal Edward Snowden exposed, which clearly show how intelligence agencies do operate on their own independent of the state and many times get away with it or are caught many years later. Which is not weird since they hold the intelligence power for the state, all they need to do to deny the state power is not reveal certain things.

We can also see as there was a large minority group of jews all throughout the west, which heavily relied on ethnic nepotism, have and still do cheat (against nepotism and discrimination laws) their way into an extremely overrepresented role among leading institutions.
This elite of jews is the best example of when the social contract is not sufficient on its own. As these jews are financially freed and have the nation state Israel to move to at any time. These are people with almost no natural allegiance to their host nation, they are not financially dependent, and have a separate nation they do often have strong ethnic affinity for.
So not surprisingly they are many strong and wealthy jewish lobbyist organisations all over the west, who prioritize the benefit of jews above everyone else. And you find institutions with pro jewish views the state often negotiates with rather than commands.
And not surprisingly the west often agrees and defends the state of Israel in rather inexcusable instances. The state of Israel can plan the levon affair, sink the Uss Liberty, steal nuclear technology and invade any country, even when the west tries to negotiate with them like Iran.
Jews can plan the “Lavon Affair”, kill Swedish diplomat Folke Bernadotte (someone who negotiated the release of jews from concentration camps), kill Lee Harvey Oswald so he can’t stand trial and testify, and with Jeffrey Epstein run a child sex trafficking ring and blackmail operation.
And a lot more.
And many of these events have been tolerated and excused.

So the state panders to different interests than that of the native people, and often it is that of specific institutions which are very powerful, or it panders to non-natives. As they have power and a small need for security.
Which explains a lot of weird behavior of a state to allow and cover up immigration problems, to allow social media to spy or censor people, to always defend state acts of israel, to allow jewish people freedom of association such that they can segregate and discriminate but not whites, to defend and subscribe to social marxism as media and schools have dominantly become and will protest when not allowed to preach it, etc.
Again, these problems often stem from the original dilemma which is when the social contract doesn’t work. Which is when people or institutions are too powerful or don't need security.
And sadly the west hasn’t embraced the necessary conditions to make the social contract work, which is either following its principle of providing security, or by making people dependent.
As western states lose care to provide security the only option is to make people dependent on the state. And it does so by begging for the power of institutions. And so naturally institutions won’t be forced into being dependent on the state, but the people will be.

If western states will just be tools for institutions to enslave society because they do not dare apply the social contract against institutions, then a return to state religion might be the only solution.
It is at least required to propose principles that work in justifying the state taking and using power, and a state that actually does so against the institutions.
Principles like, Security (civic nationalism), Identity (ethnic nationalism) or the good itself (objective morality/religion).

The best possible state incorporates all three.
Principles like providing security, upholding an identity or objective morality, are all motivations for supporting the state. As these are basic needs in people, to feel safe, to have an express identity, to do good.
But these principles fail when institutions aren't forced to obey, or aren't motivated to obey. That's why the best working states are those that incorporate all three, and do force institutions when possible to obey the state.

Meaning to get a state that works we need to support a state that upholds these principles and enslaves institutions rather than the people.
And depending on the society it looks like we as actors should use our power in different ways. If institutions are too strong we need to hurt them. If the state doesn't enforce the principles, we need to hurt them. If the institutions support our principles but are being weakened, we should support them. If the state supports our principles and are weakened, we support them.
Basically we support anyone who support our principles and weaken those who reject them. That's all we can do.

Since it now appears the state does not honour the social contract and provide the security and thus is illegitimate, we are now entitled to revolt. So how does one go about creating revolt?

A lot of the power of the state comes from indoctrination. René Girard tells us that some of our behavior seems to be imitations of other's behavior. So as we the older generation our parents or teachers obeying the state we do so as well. And when we look around and see others doing so we do so as well. People have the natural reflex to imitate others based on what is socially acceptable.
The state is often just that its a system of obeying and propagating a social norm. A lot of our understanding of what the state is and can do comes from this. We aren't always thinking of the parliament but everything in between done on behalf of the state.
For example the state is the public schools telling us what to think and not think. The state is the one who prosecutes us when we commit a crime. The state is only present as a social construct. Not as a tangible thing but as a concept that we all agree to.
So why do everyone agree to it, as most people today don't know or care about any "social contract" or idea to legitimize the interference of the state in their lives, everyone just accepts it as valid.
Most commonly it is because people have the need for identity, including group identity, we want to be socially acceptable. And there are institutions now that teach us what is socially acceptable and not, and One of the most important things is to follow the law, obey the state, and die for the state in war.

Institutions like schools, news, film industry, music industry, media, etc, are often engaged in commenting on what is socially acceptable, even when they have the responsibility to be objective like schools and news. And for the antisocial who disobey anyways the state can punish.
The stick and carrot.
Theodore Kaczynski did offer another option the state or system uses to control people and it is by simply tricking its members to misdirect their frustration. Kaczynski described how society becomes the cause of frustration as it becomes unnatural, inhuman, and removes freedom/autonomy. And that this frustration needs to be lashed out at something, so the system or state tricks people into directing the frustration against that which is natural, human and liberating. “The left” is a perfect example of misguiding their efforts. They wish for power to the people, yet ask the state to remove the right to bear arms. They wish for worker conditions, yet ask for migrants and support affirmative action.
They are clearly frustrated with the unnatural, inhuman and limited freedom from society, yet they are somehow being tricked into putting their effort into making society less natural, less human and less free.

All this to say the natural way to start a life of dissent and revolt is to:

1 Stop and avoid the indoctrinating processes.
We often underestimate the psychological impact that propaganda and other phenomena has. And it is strongly encouraged to get used to avoiding watching any type of screen. Phones, TVs, computers, radio, etc.
A social interaction may have a psychological effect in creating a narrative your brain wants to conform to. And screens have the power of many hundreds of social interactions.
Because it is quite literally us watching hundreds of people tell us things. And because media is becoming increasingly monitored, censored and controlled by intelligence agencies, it creates more controlled narratives.
Screens and the internet is quite literally a primitive form of mind control, which is why the intelligence agencies are all over it to control and use it.
That is why there are barely any free speech platforms left, because that risks exposing the population to value the narratives themselves.
Use seclusion as a means of suppressing your emotional investment in the status quo narrative.
This applies to social interactions, clubs and even churches if necessary. Because sadly many congregations standardize their support for state over religion.

2 Desensitize yourself to dissent, crime, revolt and paramilitary actions.
There are many congregations which hold fast to their religion over the state, these serve as good socialization for dissent.
There are also many congregations which are syndicates for crime, revolt and paramilitary action, but this should be sought after later.
In the beginning one should emotionally revolt by getting used to dissent. Matching their emotional/behavioral state with their intellectual beliefs.

The best thing is to attend non-criminal or “not too radical congregations”.
Basically keep building your intellectual dissent, and desensitize to emotional dissent by the social interactions with like minded people.
Without risking getting caught up in crime or legal process, or getting documented on some list. Though these are seldom private and authorities can find and document who attends what political factions, it really only shows motive in a trial, which is often not nessecary for the state to prove anyways. Meaning it doesn’t matter much in trial if they figured out a motive since they don’t need one, it might matter as motive helps point the investigation and might sway the jury a little, but this is a rather small issue, it all comes down to what can be proven or not.
Avoid criminal and probably police infiltrated groups, to begin with.

3 Start doing legal and easy research on how to mass revolt.
One can also intellectually discuss on the internet to make others dissent. If anything it helps you develop your own intellectual dissent.
But this should not be done often as it most often is a waste of time.
Instead focus on the main task of learning and developing your understanding of revolt.

Often Used Sources

I will give a list and description of often used sources. I don't use all these sources and sometimes not all the content in them, but the list is provided for those who want to research on their own.
This will hopefully bring attention to good sources that merit the attention, but also help understand the perspective I'm coming from (how I chose to research this).
By familiarizing the reader with these sources I also think it helps the reader evaluate the sources and information discussed.
I highly recommend pirating these and archiving them so they are preserved.
Lastly I obviously recommend the "Formal manuals" first, and the "handyman survival manuals" as tips and tricks for things to look for.

Classic Sources:

These are famous works in the world of "utilizing forces" or power. These commonly teach how to make explosives, improvised explosives, assassination, etc
I divide these works into two categories; the "handy-man survivalist manuals", and the "formal manuals".

I distinguish between these categories as they tend to, but not limited to, discuss different things and have different reliability.

"Formal manuals"
These tend to be structured, proper and scientific inquiry.
They are often written by the educated, those who dedicate much time to the research or are experienced in the field.
They also tend to study and teach methods based on effectiveness.
Usually valuing safety, yield, potential strength, likelihood of success, etc.

"Handyman survivalist manuals"
These tend to be more simple and concerned with teaching the power related information, not all scientific details.
They are often written by laymen, or sometimes dedicated laymen, and those who learn by experience from revolt-related groups, or simply developed from handyman tricks.
They also tend to teach methods of improvisation.
Usually valuing cheapness, simplicity, speed, etc.

Basically the survivalist manuals are generally less reliable and focus on methods which require less.
While the formal manuals are generally more reliable and focus on methods which are effective.
But these are just tendencies. And both types address different methods based on different virtues and effectiveness.

Starting with the “Formal Manuals”:

1 US Army Manuals

For some it is ironic that the US Army Manuals are some of the best sources for knowledge helpful for terrorists, but it is true. The US Army Manuals cover a wide variety of topics regarding soldier life. And provides some of the best and rigorous analysis or insight.
And a lot of these manuals address topics which are suitable for the layman, hand to hand combat, first aid and other medical tips, improvised explosives, etc, which understandable since soldiers are sometimes in limited situations, like the layman.

There are so many, even more counting all editions. So I can provide the following list, without guaranteeing that it includes all the ones I use, so read the references if there’s something particular there:
https://archive.org/details/weapon-manuals/Advanced%20Map%20and%20Aerial%20Photograph%20Reading%20by%20US%20war%20dept%201944%20version%202/

https://archive.org/details/milmanual-tm-43-0001-29-army-ammunition-data-sheets-for-grenades

https://archive.org/details/military-manuals

2 CIA Manuals

Everything said about the US Army Manuals apply to the CIA Manuals as well.

The CIA manuals I use and a lot more can be found by the following link:
https://archive.org/details/criminal-guides-and-manuals/21%20Techniques%20Of%20Silent%20KIlling/
This link is a solid collection of “criminal manuals”.

3 Tadeusz Urbanski and his four volumes of “Chemistry and Technology of Explosives”

Tadeusz Urbanski was a polish doctor in chemistry, and he has written four volumes of “Chemistry and Technology of Explosives”.
This is one of the best if not the best source. I highly recommend these works if one is going to research on their own.

Volume 1:
https://archive.org/details/ChemistryAndTechnologyOfExplosives

Volume 2:
https://archive.org/details/ChemistryAndTechnologyOfExplosives-VolumeIi

Volume 3:
https://archive.org/details/Chemistry_and_Technology_of_Explosives_vol_3_Urbanski

Volume 4:
https://archive.org/details/Chemistry_and_Technology_of_Explosives_vol_4_Urbanski

4 TNT Trinitrotoluenes and Mono- and Dinitrotoluenes Their Manufacture and Properties, G. Carlton Smith

G. Carlton Smith was a general instructor in chemistry for the School of Applied Science, Carnegie Institute of Technology in Pittsburgh in the early 20th century.
His work is a classic and somewhat forgotten work on nitration of toluenes.

https://archive.org/details/tnttrinitrotolue00smitrich

5 Military and Civilian Pyrotechnics, Dr Herbert Ellern

Dr Herbert Ellern was a chemist specialized in pyrotechnics, and is famous for two works:
Modern Pyrotechnics: Fundamentals of Applied Physical Pyrochemistry
(not available on archive.org)
Military and Civilian Pyrotechnics
https://archive.org/details/Military_And_Civilian_Pyrotechnics_Herbet_Ellern

6 Thermitic Thermodynamics: A Computational Survey and Comprehensive Interpretation of Over 800 Combinations of Metals, Metalloids, and Oxides, Anthony Peter, Gordon Shaw.

Extensive work covering many different variants of thermite.
https://sv.annas-archive.org/md5/d96088992b59067b4ce5df18665e6d7d

7 “LASL explosive property data”, Gibbs and Co

Good composite of general and niche information on explosives, with statistical listing and tables of exact values.

If you have questions about an explosive there's a lot of data and descriptive text available here.
For example data on sensitivity and descriptions on synthesis.

"LASL explosive property data", Gibbs and Co, 1980, p,
https://archive.org/details/LASL_Explosive_Property_Data/mode/2up

Moving On With The "Handyman Survivalist Manuals":

8 Jared Ledgard's preparatory manuals

Jared Ledgard is a highly suspect individual, there's basically no information about him and his works are published by "paranoid publishing group", which does sound so dumb it might just be a name he made up to have an "independent" publisher. He might just use a pseudonym and be a "snake oils salesman" who kinda spews a bunch of information in books and tries to sell them.
I ONLY LIST THESE SO ONE CAN SEE IF THERE'S INFORMATION THAT HE HAS IN HIS BOOKS ALSO BEING SAID ELSE WHERE. Basically to find ideas and see if this is something many people say (multiple attestation).
Some of the information would seem to work at least in theory.
It seems he is basically copy pasting other people's work, which means it isn't necessarily unreliable, but he never cites them. So one doesn't know if he got it from a real source or something he read in another random manual.
Another suspect part of his works is that he never lists the expected yield. Showing that he probably didn't perform any experiments himself. Further it is unsafe to not know how much explosives one is expected to make.

THEREFORE IF YOU ARE GOING TO TRY ANYTHING IN HIS WORKS, JUST LIKE IF YOU TRY ANYTHING IN MY WORK, OR SOME OTHER WORK, START WITH EXTREMELY SMALL AMOUNTS.
YOU CAN USE BASIC CHEMISTRY KNOWLEDGE TO CALCULATE HOW MUCH OF EACH MATERIAL IS NEEDED TO MAKE 1g OR 0.5g, ONLY EVER TRY WITH SMALL AMOUNTS AND SCALE WITH EXPERIENCE, CONFIDENCE AND KNOWLEDGE.
THIS ESPECIALLY APPLIES TO ALL THE "HANDY-MAN SURVIVAL MANUALS".

Some of his works are:
The Preparatory Manual of Explosives
The Preparatory Manual of Chemical Warfare Agents
The Preparatory Manual of Black Powder and Pyrotechnics Version 4.0 Volume 1
Kings Chem Guide: Introduction to general chemistry: theories, practices, and exercises

There's also some stand alone books like:
Services Textbook of Explosives

Home-made: A compilation of chemical processes for making a variety of products from simple store-bought and readily available materials
AFP: Aluminum Flash Powder Explosives
The Munroe Effect: A Professional look at the Science of High Explosive Shape Charges for Various applications

I highly recommend if you plan on reading these that you pirate them so he doesn't get paid for books where there's no citations, no expected yield, etc.

The Preparatory Manual Of Explosives:
https://archive.org/details/Preparatory_Manual_of_Explosives_Ledgard/mode/2up

A Laboratory History Of Chemical Warfare Agents:
https://archive.org/details/jared-ledgard-a-laboratory-history-of-chemical-warfare-agents-jared-ledgard-2006/mode/2up

9 Anarchist Cookbook, William Powell

The most classic informal manual on improvised munitions is the "Anarchist Cookbook" written by William Powell and published 1971.

https://archive.org/details/theanarchistcookbookwilliampowell/mode/2up

10 Anarchist Cookbook 2000

The "Anarchist Cookbook 2000" is an attempted rendition of the classic "Anarchist Cookbook" for the 21st century.

https://archive.org/details/anarchistcookbook2000_202110

11 Poor Man's James Bond Series, Kurt Saxon

Similar to the "Anarchist Cookbook" it is a manual for the survivalist type, but is written in the form of a series of volumes.
There's a total of 5 volumes and they were written and published in the 1990's.

Volume 1:
https://archive.org/details/The_Poor_Mans_James_Bond_Vol_1_Kurt_Saxon

Volume 2:
https://archive.org/details/THEPOORMANSJAMESBOND2

Volume 3:
https://archive.org/details/The_Poor_Mans_James_Bond_Vol_3_Kurt_Saxon/mode/2up

Volume 4:
https://archive.org/details/KurtSaxonPoorMansJamesBondVolume4

Volume 5:
https://archive.org/details/KurtSaxonPoorMansJamesBondVolume5/mode/2up

12 Improvised Munitions Black Books Series

Similar to the Anarchist Cookbook 2000. It is written by an unknown writer but is mostly meant to document the classic development in improvised munitions during the late 20th century.

https://archive.org/details/ImprovisedMunitionsBlackBooksVolumes123/

13 “Improvised Shaped Charges”, Desert Publications

Demonstrates basics of shaped charges, the monroe effect, and the glass bottle improvisable trick for shaped charges.
Basically how to create a penetrating bomb, not just a fragmentating bomb.

https://dn710006.ca.archive.org/0/items/resistance_202309/ImprovisedShapedCharges_text.pdf

14 Professor Parabellum “Practical Scrap Metal Arms Series”

Long series on all sorts of firearms you can make from scrap metal.

https://archive.org/details/professor-parabellum-collection_202311/Professor%20Parabellum%20-%20Practical%20Scrap%20Metal%20Small%20Arms%20Volume%201%20-%20The%20DIY%20Sheet%20Metal%20Self-Loading%20Pistol/

15 Caleb Lee's "Underground Manuals"

Three manuals that show improvised variants for firearms:

Ak-47 build
https://ia800307.us.archive.org/34/items/out-of-print-and-rare-books-collection/undergroundak47buildmanual.pdf

1911 handgun
https://ia601608.us.archive.org/17/items/fm-23-35-combat-training-with-pistols-and-revolvers/The%20Underground%201911%20Guide.pdf

AR-308
https://secure1.ghostgundvd.com/UndergroundAR308MainManual.pdf

16 FGC-9 MK II Guide

A guide for designing a 3D-printed untraceable gun.
Made by dispensed deterrence: jstark, icanthetroll, 3socksandcrocs

https://archive.org/details/fgc-9-mk-ii-guide/mode/2up

3D-designs are also made by ctrl-pew.

The entire guide is saved page by page in appendix 2.

Internet Creators

The internet has tons of video makers and writers who make all sorts of relevant content in the world of chemistry. And there's a sub-group of those who have a specific focus on energetics and usage of energetics.
There's great value in internet creators which makes them worth mentioning:
1 They publish content which can be reviewed and analyzed in the public sphere.
2 They can show what it looks like and how one does the procedures. They also show sensitivity testing, both impact and friction, among others, which can be useful when trying to grasp how to handle explosives.
3 They often readily research and test things (better than me) and share this publicly.

The reader should consider archiving the information if ever the following links become unusable or the creators censored.

17 Dugan Ashley

Dugan Ashley is a weapons enthusiast who used to make gun related satirical youtube videos under the name of "Carnik Con". He has been on and off the internet scene for sometime and only recently came back to finish his video series on energetics.
Some of his breaks and pauses have been due to health related issues.

He sometimes unlists his youtube videos for safety's sake but the links in references should always work. If for whatever reason a video was to be deleted, they all exist on his bitchute and odysse. And some exist on archive, if you search his name.

His Youtube:
https://www.youtube.com/@duganashley1337

His Bitchute:
https://www.bitchute.com/channel/FZhvdAOC1oRy/

His Odysse:
https://odysee.com/@DuganAshley:e

His Archive:
https://archive.org/search?query=creator%3A%22Dug%22

18 Darian Ballard

Darian Ballard is less theoretical and focuses mostly on practical videos. Often focusing on synthesis and comparison of explosives.

His Youtube:
https://www.youtube.com/@darianballard2074/featured

His Secondary Youtube:
https://www.youtube.com/@darianballard348/videos

His Bitchute:
https://www.bitchute.com/channel/JJNI53eMMLUy/

19 NinjaChemist

Russian pyrotechnists channel, with very useful procedural information.
His youtube:
https://www.youtube.com/@NinjaChemistChannel/videos

20 John Black Superchemist

Lesser known and long time contributor. A bit crazy.

His youtube:
https://www.youtube.com/@johnblacksuperchemist2556/videos

His Bitchute:
https://www.bitchute.com/channel/u9H6xAuMA5qF/

21 The many chemistry related internet creators

There's a large number of chemistry related internet creators who provide information on almost any topic of chemistry and thus one can find a video showing almost any type of procedure. Many of these are easily found on youtube.
These channels sometimes are even censored for showing how to make drug or explosive related topics. And one can then while researching find confirmation and nuances by finding many creators showing their examples of operations. So it is highly recommended to research on your own.

22 Online Amateur Chemist Forums

These are forums for amateurs exploring chemistry and often that of "dangerous" chemistry. These are good to share information and find items to further explore. And these are often not worried about censor issues.

https://www.sciencemadness.org/

Avoid Crime Initially

In this initial phase of learning it is important to stay away from criminal activity. The idea is to only commit crime only after you have learned and practiced for it. Only commit crimes when you have maximized likelihood of success, don't take unnecessary risks.

This applies to the research, in general everything done on screens and the internet is recorded. So if you commit a crime and are investigated, any and everything you might have studied many years ago could be dug up and this can help prosecute and convict you.
So it is sound to be well read and practiced before committing crime, rather than doing so in the middle of learning.
In a sense one could say it is the worst of all possible worlds, you commit crime lacking important knowledge, and you have recorded information which could convict you.
Instead of either committing crime lacking knowledge and having no prior traces of study, or committing crime well studied and less likely to be caught with prior traces.

A second thing to be aware of is avoiding being connected to crimes in general. If you avoid committing crimes you will probably not risk being prosecuted, but you increase that chance by avoiding criminal activity in general. Avoid even being in the proximity of crime.

How to research

I recommend that when researching these topics one tries to focus very specifically. It is a lot easier to find information and write if the questioning is very specific. But I also recommend that once you find something that may be helpful for another project that you save the citation and information but don't dwell on it and lose focus.

The tools I recommend using is:

Google Scholar, which is a commonly used database even among serious scholars. The studies and books are often not free. But the function it serves is:
Finding relevant studies (though not the content, which is often behind paywall)
Finding citations and references of studies. This helps see developments in time.

Sci-Hub, which is a shadow library that provides free access to millions of research papers, irregardless of copyright laws. This is to help common people access studies often behind paywalls. We can also here look at what studies a study cites to backwards in time.
Combining Google Scholar which quickly finds all relevant studies, what it cites, and which cites it, with Sci-Hub which likely gives free access to almost any study. One can easily access any information they desire.

Archive.org, this is also a very important database which archives anything. I recommend going here to look for works on Google Scholar which are not found in Sci-Hub, things like books.

Annas-archive.org, this is another shadow library that offers free academic content. I suggest checking here also for books that are behind paywall and are not found on archive.org.

ChatGPT, lastly one can use ChatGPT to help find and organize information. The only problem might be that it is specifically programmed to avoid teaching “dangerous” information, though one can obviously still draw out useful information.
I suggest using it when feeling stuck, one can by asking very specifically have it draw out information that points you in the right direction on esoteric details.

Remember certain criteria to determine what is reliable and what isn’t, and you should apply these critical thinking skills when reading my book:
1 Is the source anonymous or a real person who has education and takes responsibility for what they right. I’m anonymous for example and I don’t source everything I claim. So I recommend you cross check information, especially on flammables, explosives, toxicants, biological weapons, as one should before attempting anything like that.

2 Are there references or citations you can read yourself to see if they say what the source is claiming.

Acquiring Practical Knowledge

University

For those who go to university or plan to do so, this is a chapter relevant for you to keep in mind. What kinds of things are available to you.

Access to Databases

Universities often provide accounts on websites which provide free reading of studies. One can use this to contribute to the Sci-Hub project offering any databases they do not already have access to, or has not access to now specifically.

Access to Labs and Chemicals

Universities have laboratories, both for physics and chemistry (less used by biologists). These laboratories can have everything from physics related (radioactive substances, equipment) to chemistry related (chemicals, equipment.
This equipment is not only very useful but very valuable. Having access helps to steal this equipment. This access is often in the form of a keycard, and it is often temporary. That is why you can use the temporary access to scope the place. And plan a robbery, this is further covered in the chapter on stealing.

Proper Education

Proper education in general is of course good for jobs, but physics and chemistry can be especially useful for purposes of revolt.

Sports or Fighting Clubs

These are often completely legal, offer training in hand-to-hand combat and can build connections with serious nationalist people.
Though the nationalist element can vary a lot. Most average clubs are mixed with women and foreigners, but with effort one can find male and native dominated clubs. Typically these are those which emphasized classic and serious sports, like boxing, wrestling, kick-boxing/muay thai, mma, etc.
“Sports” which should be avoided are the “martial arts”, karate, jiu jitsu, judo, aikido, etc, (those with white dresses) are often shitty, full of women and foreigners.

A good example of this kind of organization is “Active Club”.

https://activeclub.org/
https://aktivklubb.org/

If these links go out, you can easily find an active club on telegram.

Hooligan Clubs

These are often irrationally devoted to a sports club but don't have the same devotion for more real identity like nationality. Thus sadly most common hooligan clubs are mixed with foreigners, avoid these at all cost.
The common or large hooligan clubs are often, disorganized criminals, mixed with foreigners, infiltrated by police, under constant surveillance.
It is recommended to pick a more obscure, lesser known, low key, hooligan team, for an all white team and hooligan club. These groups have less resources and will be forced to be more careful about their criminality.

The benefit is that these groups offer experience in break-ins, vandalization, pyrotechnics, assault/fights, etc

Biker Clubs

Sadly Hells Angels and Bandidos (the largest two biker groups) have become beaten down by law enforcement. Furthermore they have also opted to “sell out” by prioritizing profits over race and being a biker club.

As mostly white men want a biker club, the natural state was that these clubs would keep it white, to value the biker lifestyle.
Instead these groups have let the criminal element organize side projects, like youth training subgroups, these subgroups are intended to train youth into crime, with almost no emphasis on “biking”.
These groups are also filled with non-whites.

Avoid these youth groups, these are not serious, and one only acts as a footsoldier for petty crime.
Joining the actual biker groups can seem pointless because they have severely reduced criminal capacity. But it has become more like the mafia. One needs to dedicate a long time in the main organization, then you will start being introduced to the representatives of the criminal element, then you are made a “made-man” in the sense that you become part of the criminal operation.
Is the long time and dedication worth it?
Probably not.

Militia

Militias are mostly found in North America. But these are more recommended than nationalist/national socialist parties, and actual paramilitaries.
The reason is that these groups avoid illegal activity, and might sometimes pull publicity stunts.
But otherwise they emphasize the training in weapons and armory, which is not illegal.
This is a good place to get experience and training without much risk of conviction.
Though remember even these groups will be sometimes spied on by authorities, thus one should be speaking as innocently as the group is.

Paramilitary

Real paramilitary groups can be found in many places. North America and Europe have the most relevant ones. There has been in Australia but there is nothing serious in modern times. South America has paramilitaries, and these are well established, but are too dangerous as they constantly engage in conflict, thus it is not an ideal starting place for experience, it is a “baptism by fire” and sometimes without proper training.

The current best known alternative for right wing paramilitary activity is the “Russian Imperial Legion” which is the paramilitary wing of the “Russian Imperial Movement”.
“Russian Imperial Movement” cooperates with nationalist organizations all over the world, and due to their particular good position, they offer training and education for many other groups.
https://rusimperia.is/
Though the safest way may be joining through another movement like for example the “Nordic Resistance Movement”, which may have contacts to them.

Military Service

Military service is usually a short and concise education in basic military life, “basic training”. This is the best starting point for anyone interested in paramilitary activity. As it is completely legal and normal, no risk for any criminal problems, investigatory authorities.
One only needs to be careful not to talk about unnecessary things in a public or official manner.
Ideally one would not talk about such “things” at all, to not risk anything.

If one does military service, without talking about “things”, then there’s no risk for any real consequences at all. And one receives simple basic education and experience, discipline and pay.

Proper Training In Weapons and Survival Skills

One does not only receive training for weapons, but general survival skills, like how to survive in forest conditions. And many other useful things which carry over to paramilitary life.

Access to Weapons and Other Equipment

One also receives access to all sorts of equipment which is useful and valuable. This is important because one can steal from the army.

Insider Information

One also has valuable insider information, especially the more you climb in ranks, which can be useful and valuable by providing it to opposing forces.
For example providing information on nato military to the russian army as a spy.

Source of Capital

Military carriers are lucrative, simple and come with many benefits.

Mercenary Groups

One could also join mercenary groups. These are often active though and can have high mortality rates. These are preferable to active paramilitaries. Because mercenary groups are more professional, have better weapons and training, and are legal (enough).
Thus this is superior to joining paramilitaries, unless the paramilitary is inactive and has professional level equipment and training.
One possible mercenary group is the “French Foreign Legion”, I only mention them because they do have some benefits. Like if you are a wanted criminal for minor crimes or in problems with other criminals, an easy escape for a new identity is joining the French Foreign Legion.
Though it is a long contract and high mortality rate. So only recommended out of desperation.

The one I recommend the most out of mercenary groups to join is the “Wagner Group” or other russian mercenary groups. The real disadvantage may be a long contract and the notion of placing new recruits on canon fodder roles, with high mortality rates. Though the mortality rates have likely gone down as the worst battles have been fought in Ukraine and the front has stabilized with russian defense fortifications.

It is recommended because it offers sanctuary for wanted criminals. And it is an easy long term contract which helps you become a citizen in Russia.
Russia now has initiatives to help non-russians with right leaning views to move into Russia. And if one plans on doing this to get out of trouble in their own country, one could also do missions with Wagner. Helping the interests of the Russian state is generally good as it is bad for Nato, the largest hegemony at the moment.
So becoming a more safe and easy escape for criminals, it offers ways to become russian citizen, it furthers russian interests.

Anonymity

First Rule, Don't talk

Unironically very important and common mistake of criminals. Like staying behind to watch the explosion or returning to the scene of the crime.

It cannot be stated enough, whenever talking to the authorities you use your right to remain silent and ask for an attorney.
And you should not brag to your friends or family about anything unnecessary. 99% of the time there's no reason to expose yourself but many people feel the need due to social validation to do so. Do not tell anyone about anything.
If you have to say something, you don't remember, if you can remain silent do so.

There's exceptions when you can't use your right to remain silent, but then they will explain that to you, like if you are granted immunity.
In that case you should just say "I don't know" if it is something incriminating against your co-conspirators.

Again, if you are called for an interview or interrogation or whatever. If you are a criminal you should assume that's the reason they want to talk to you.
And it doesn't matter if you are arrested or in custody.
You do not talk to your psychologist, your cellmate in jail, or the police officer, only your lawyer.

Remember always:
You use your right to remain silent.
You want a lawyer.

(if its some special case, like you are granted immunity, and cannot be convicted by that testimony, but you must testify then:

You don’t remember anything (make up excuses you cannot be convicted anyways, say you did a bunch of drugs and don’t remember anything).)

Surveillance

Society now has many types of different surveillance which needs to be considered whenever doing criminal acts or planning criminal acts.
One aspect of surveillance is that it is archived for a long time.
Another is that typical methods of removing electronic memory don't actually permanently delete the memory.
And lastly that different types of surveillance can be combined to track your place and what you are doing.
Basically people might underestimate how much of society is surveillanced, how it can be used, and how hard it is to prevent.
And people may not know when authorities have access or not to the surveillance information.

That is why the best way to counter surveillance is to be aware of the different types that exist and consider what are relevant for the situation one is in, and from there take whatever methods necessary.

Firstly there’s the public surveillance of society. This is surveillance on anyone in public and usually these require a warrant for authorities to check. And the warrant doesn’t need to concern suspicion on an individual, it needs only suspect evidence for a crime to be present.

Secondly there’s investigatory surveillance. These are methods of surveillance that the authorities use against suspects, individuals or groups. They naturally demand a warrant by authorities that show “probable cause” (possible crime or evidence is there) for a specific individual or group.

So one who commits a crime in public, can expect at the minimum public surveillance, as authorities will have a warrant to use the public surveillance.
And if there’s evidence or surveillance suggesting one is involved in the crime, then that is usually sufficient warrant to start implementing surveillance methods, depending on the crime.

An example of how this works is the “Adelson case”. The Adelson family had hired hitmen to kill an ex-family-in-law. So the assassins killed the man and drove off in a car.

The authorities firstly accessed public surveillance and tracked the car, at some point they got a good picture of the face of the killers and eventually found and interrogated them.
The authorities then learned of a woman who had asked on behalf of others for the hitmen to carry out the murder. A “middle-woman”.
They then used investigatory surveillance to spy in public and listen to phone calls between this woman and her associates which included the Adelson family. And eventually in modern time one of the Adelsons have been sentenced and another awaits trial.

There are many good things and mistakes the Adelsons family made along the way. I personally recommend watching the Charlie Adelson trial to learn more about how surveillance works and how one can avoid or respond to it.

Public Surveillance

Whenever committing crime in public or travelling in public one needs to consider the following methods of surveillance:

Security cameras.

These are common and everywhere, any type of crime involving public stores, schools, facilities or roads, especially in cities, and they need to be addressed.
In many movies they attempt to disable the cameras, but the simplest and best option is to simply anonymize oneself. This means at the minimum:
One covers their face and body, their identity.
One removes license plates from the car, or uses fake license plates.
And one is able to move away from any area with cameras and hideout, ideally one month.

Along with committing crimes in public, I suggest using extra effort, to:
Not leave DNA, fingerprints or footprints.
For example, don't leave food or cigarettes with saliva before committing crime, wear gloves, and destroy the bottom of shoes to change the pattern.

The video of security cameras can last anywhere between a few days to months. On average, probably one month.

Door bells, camera and/or auditory.

These are worth mentioning separately, some door bell alarm systems provide film and/or audio, and can film across streets.
This is worth considering when doing crimes in urban areas, like home invasions, kidnappings, etc.

So check for security cameras or doorbell systems.

Cell towers

These capture signals from your phone all the time. And can be used to find out where the phone was, when it was there, call logs, what app was used.

It is extremely important to remember that phones are only guaranteed to stop communicating with cell towers when they are turned off.
And the phone is guaranteed to be fully turned off by removing the battery. So it is recommended when committing crime that you use a phone with a removable battery, so that you can remove it and avoid cell tower data, when it is fitting.

The simplest solution otherwise is to simply leave the phone at home when committing crime.

With regular Iphones to stop cell tower signals, turning the phone off with the power button is generally sufficient. But with later models it doesn't stop all signals. Some signals can still be sent with "Find My IPhone" feature, and these could also cause residual signals.
So either you want to disable the "Find My" feature to avoid this. Or use a secondary phone with a removable battery. Or simply leave the phone at home.

The last option is using a Faraday Bag, or signal blocking bag. These are good to block signals from ones own phone. Or these can be used if you plan on stealing phones or electronics.
When stealing phones it is recommended you take the phone, turn on airplane mode, then put it into a faraday bag.

I also recommend faraday bags for any electronics you might worry are sending signals.
For example if you steal a car, remove the gps tracking device but are worried it is still working.
Or you steal money from a bank, and don't have time to go through it all to make sure there is no gps trackers.
A faraday bag is perfect to place things in it and remove the chance that the electronic is able to communicate via signals.
It counters GPS, Cellular data, bluetooth, etc.

A method the authorities sometimes use is called "tower dumping". Which involves collecting all the data on all the phones connected to a tower at a relevant time and place.
So if a major crime was committed in an area it isn't unreasonable that they check who was in that area via cell towers.

Public Wifi logging

This includes all wifi connections which are not your own. At stores, airports, hotels, cafes, universities, fast food places, libraries, etc.
These routers which provide the free wifi, are able to log the ip-address, approximate distance to the device from the router, and the internet activity like internet searches made by the device.
It can see what device, where it was, and what the device did with the internet.

The Connor Bowman case is an instance where the university voluntarily turned over his internet search history to authorities showing all his research into drugs for poisoning.
One should not research anything illegal on the public internet.

Surface Web tracking

The surface web, also called clearnet, is subject to tracking as well.
Internet accessible by regular browsers logs:
IP-address.
DNS logs show what website you accessed.
Google analytics logs your visit, what you clicked, and the time spent on a page.
“Cookies” log your activity on a website, what items you click on.

And clearing “cookies” or deleting search history does really neither thing. It neither removes the online fingerprint and the history on the computer is still accessible even when having been “deleted”.

To help avoid tracking there are a few tips one should be aware of:

1 Restarting the router.
This can sometimes help you get assigned a new public IP-address. It is recommended you be on a dynamic IP-address.
Regularly changing your public IP is something that can prevent some IP-based tracking.
But along with restarting the router one should take breaks or use the computer at different times otherwise the same IP can be assigned.

2 Using intermediaries.
This would be things like proxies, proxy-websites, Vpns or overlay networks like Tor.

Investigatory Surveillance

Once you are a suspect for the police they will start using these methods to ensure they have enough evidence so you will surely be convicted.
Meaning they might suspect it's you but won't arrest or interrogate you until they have more solid evidence.
Early arrests allow co-conspiritors to destroy evidence from the police.

So the strategy generally is to prevent possible evidence as soon as one realizes they are suspected by the police.
And as soon as one is arrested one has their co-conspirators destroy any evidence they have and hide themselves.

There's public surveillance that the authorities have access to if they think it can lead to evidence. And we take this into consideration as we do crimes in public.
But when one realizes that they are a suspect, giving reason to authorities to think they may find evidence through intrusive surveillance, then more efforts need to be made to avoid this surveillance.

One should think that they are individually suspected by police when:

1 They repeatedly contact you.
Ask for interviews, or for you to visit a police station.
They do this sometimes without officially arresting you, so that they don't need to bring up your Miranda rights.
If you are called to an interview by police, you use your right to remain silent and ask for an attorney no matter what.

2 Police have contacted your family, friends, work or school about you. Here it is important to have reliable friends or family who will warn you, as work and school mates probably arn't going to.

3 Undercover police cars or police.
Undercover police cars usually have extra lamps on the grills, front windshield, sides, under the side mirrors. And sometimes lamps within the grills.

If you notice a car or people that follow you even in circles, meaning you go around a building once or twice and people or cars are still behind you. This is also great reason to suspect undercover police.
If you suspect an under cover police car you should try and look up the license plate to see who it is registered to.

4 Warrants.

If the police present any type of warrants then one should immediately consider themselves a suspect and warn, in a safe manner, all other conspirators. And then consider destroying any evidence which the police have not uncovered.

5 Known evidence against you.
If committing a crime you realize that you left identifying evidence against you. You should consider yourself a suspect, and hide evidence quickly, and then “lay low”. You must hide what is available, and not continue with criminality, and hope while waiting that the police don’t have sufficient evidence.

An example of this is:
You and a friend rob a house. Then drive to a safe point, switch clothes and go separate ways. You walk home and realize there’s a camera capturing you while you are still relatively close to where the car drove off.
This means that when the police scan security cameras they will eventually find you walking in proximity to where the suspect vehicle went. So they either suspect you or think you can witness for them about the vehicle.
At this point you decide to return home quickly, call and inform your friend and then hide the loot and your electronics well.
Eventually the police ask you to come to the station. You go and use your right to remain silent. And go home. Depending on the crime and what evidence they might have gathered about you, like the video showing you in proximity of the suspect vehicle, they will perform different types of surveillance and for different time periods.
You then don’t commit crime or contact your friend for at least a week if the evidence is weak. But if you suspect greater evidence or stronger suspicion and that you are still under surveillance, you aim for a month of normal behavior.
Lastly they might arrest you and try and prosecute you, but at least you took the proper methods to prevent evidence.
If they never arrest you, you just wait for a month or two before going back to crime again.

Wiretapping

This is when the police is able to listen in to phone calls. This is often something that is done for serious crimes and with good reasons for suspicion.
It should already be part of any plan to commit major crimes not to be too reliant on phones. And have extra burner phones with removable batteries.

The problem with wiretapping is that if they perform this on you, it is that they most likely perform regular tailing and follow you regularly.
So it isn’t quite as simple as just going to meet people in person instead, as it now might expose who your co-conspirators are.
If both you are your co-conspirator is being watched or asked to go to police stations for interviews, then meeting in person to discuss things can work. Remember to make sure noone else is around, talk low and calmly and cover your mouth.

A good way to meet is if you decide to go to a bar, and then you go out to an area where you are alone and smoke, covering your mouth with the cigarette and hand.

Otherwise an option is burner phones. You can use burner phones to contact your co-conspirators but don't over use this as authorities might catch you using a second phone, try and figure out which it is (basically what phone connects to cell towers at the same time you make calls), and then wiretap that one as well.

Phone/Computer Extraction

Another problematic warrant is the police's right to search your phone and computer. If you have an extra burner phone or computer that you have all incriminating evidence on then simply hide those. And let the authorities search your regular computer and phone.
But if those are compromising then you either have to hide them or destroy them. To hide your phone or computer I recommend putting them in faraday bags which block signals and hide them inside an object, like inside a wooden panel in a cabinet or something.

If they have incriminating evidence and you know the police will execute warrants against you and you cannot hide them.
Like if the police are outside your home and on their way to arrest you. You might not have time to hide your electronics so the quickest thing might be to destroy them.
Destroying your phone:
Drill through the internal storage chip and the sim card. If you have time you can keep destroying the motherboard and its contents.
Destroying your computer:
Drill the hard disk drives and the solid-state drivers. Again ideally you can keep destroying parts for safety.

NOTE: Factory resetting doesn't remove the memory from phones or computers, these memories are still accessible by authorities.
And this applies to most applications. Snapchat, telegram, whatsapp, search history, all of this cannot be deleted from the computer other than destroying the computer. And this information cannot be removed from cloud storage.

Good examples of how it is practically impossible to "delete" information from a digital device, such that authorities cannot access it:

Ulbricht Case,
Law enforcement uncovered many year old posts on internet forums,

Mark Jensen Case,
Law enforcement uncovered deleted search history, restored screenshots of websites, altered emails.

Jessy Kurczewski Case,
Law enforcement uncovered deleted pdf's from a phone.

Stephen Sterns Case,
Law enforcement uncovered thousands of pictures even after the phone was factory reset.

If you have incriminating information and the police will take your phone and/or computer, then you must destroy them.

House warrant

If the police are going to execute a search warrant you need to dispose of any incriminating evidence. Either by hiding or destroying.

The best thing is to have premade hiding places. Like inside wooden panels in cabinets or under the floor, etc.

If you have no good prior hiding places there are some general last minute methods to do.

Drugs and insensitive explosives can be flushed down the toilet. Even if traces are left you still get rid of the amount of drugs or explosives which is important. The amount is relevant for what conviction one gets and can be used to argue if you were trying to supply it.
You can't simply hide drugs or explosives in any fashion as they can use dogs to find it, and the same goes if you throw it in a trash chute or bush outside the house.
The best option is always to flush it down.

Electronics with incriminating evidence can be destroyed and either tossed in the trash chute, or tossed into a bush outside the house.
Same applies to guns, either the trash chute in a plastic bag or throw it out the window into a bush.

Tailing

Police often use tailing for at least a few days or even weeks against weak or regular suspects. You notice if you are being tailed by looking out for undercover police cars. Or by seeing cars follow you when doing circles or by doing many spontaneous visits.

As stated you look for many extra lights in the grills, on the grills, the front windshield, the sides, under the side mirrors, etc.
Look up the license plate for a vehicle you suspect.

You can also drive or walk in circles or visit random places, if the same people follow you each time you are likely being followed.

The best thing to do while being followed is to do nothing. You don't do anything criminal or talk to any conspirators for weeks. At most you use burner phones to announce that you may be followed and should take a break.

Undercover Agents

These are used in two ways generally. One way is to try and film or record you in public and the things you do, and the people you meet.
Or they pretend to be someone in order to trigger a reaction.

In the Adelson case an undercover police officer pretended to be an associate of the hitmen and "blackmailed" one of the Adelsons.

Having undercover agents is extremely difficult to discern, especially in the moment. But generally the same rules apply with tailing.
You can only use burner phones to tell your co-conspirators that you are being followed or blackmailed. In case it's the police.

Tracking Objects

In modern society most objects are traceable, and the simple system involves marking each product with an identifying number.
Whenever wishing to anonymize an item there's thus two considerations which need to be made.
Firstly remove any identifying numbers, traceable references.
And secondly to remove any physical evidence, like DNA and fingerprints.

Products with product number

All products today are marked with logos, model numbers, product numbers, etc. And in many cases the mere look or function of the product is enough for an expert to recognize.
That is why the best way to use products for illegal activity like for example a bomb, is to do similar to Kaczynski:
1 No DNA or fingerprints ever left on a product.

2 No product numbers that ever identify a specific item with history.

3 Use common items or products available in many places. Kaczynski used scrap materials from scrapyards.

In this way, even if authorities are able to figure out what products it is they can't discern which specific one it was, they don't know when it was produced or sold, and it is available everywhere. It doesn't narrow anything down for the authorities.
And if one wants to use wood like the Unabomber did it is important to remember that wood types can be traced so use different types of wood or some species available everywhere.

Cars

Cars themselves have a logo, model and color. So whenever you commit a crime with a car this information can be provided at least
But if a person leaves no DNA or fingerprints behind, wouldn't it be possible to simply abandon a car, since many people can own the same type of car?

Obviously not because there are personal and product identifying numbers. These are the license plate, and the VIN-number.
The license plate is an owner identifying series. Commonly criminals have used stolen license plates on their cars. Which is a very simple procedure. You either need a screwdriver or socket wrench and possibly some WD-40 if the screws are stuck.
But it is important that you only use stolen license plates for crimes and not drive around with them regularly as they are most likely reported stolen.
The ideal is to find an abandoned car with license plates, as these will likely not be reported missing.

The VIN-number is an object identifying number, meaning each car has their own specific VIN-number which identifies it. To abandon a car you need to have removed the VIN-number.
Depending on the models it will be placed on different parts of the car, but one can easily look up their car model and where the VIN-numbers are printed.
Lastly, remember if you have a computer or digital machine for your car that the VIN-number can be saved electronically as well in the car.
These car computers are the real issue, as they will prevent the car from running without having the accurate VIN-number logged.
So the correct way to go about abandoning a car is firstly removing any physical VIN-number, which you can find by looking up the model of the car.
And then when abandoning the car you destroy the car computer and its memory before leaving it. This can be done with a car fire, which is generally good as it would destroy DNA and fingerprints as well- For this it is recommended to use an accelerant to reach high enough temperatures like 700-900 celsius in order to hurt and destroy the car computer.

Again if using a car for crime:
Replace the license plate with a stolen pair.
Remove all physical VIN-numbers, so the car can be abandoned.
Bring with you accelerants like gasoline, so if you have to abandon the car, you can destroy the car computer primarily.
A simple method is to puncture the car computer, pour gasoline and start the fire.

Lastly, one can also use a stolen car for crime.
But there's nuances to this as well. Modern cars have GPS tracking devices. If you steal a car you should place it under a faraday cage, and then try and find the GPS device.
Some vehicle service manuals or wiring diagrams can list where the GPS modules are installed. One can also use specialized tools like radio frequency scanners to find the signal of active trackers.
Lastly check common hiding spots like under the dashboard, behind the interior panels, inside the wheel wells, near antennas, etc.
Generally I only recommend stealing cars to sell them in parts, as one can find the GPS tracking devices and destroy them, and the car parts can be sold without being traceable (just remove the VIN if it happens to be there).
But if one insists on using it for crime, then either steal a very old model of car without a car computer, or put it under a signal blocking cage, and look for any GPS trackers.

Guns

Generally guns today can be traced by two methods. The serial number on the side or by firearm forensics.

The serial number can be filed off, and when doing this remember to really file deeply so that there's no chance to recover the number. And check all parts of the gun inside and out if they had printed the number several times in different places.

Firearm forensics often involves something called "ballistic markings" which is just identifying the markings on a bullet with a firearm, as each and every firearm have their own slight differences causing slight differences in markings.
This is a technique to match a bullet from a crime scene to a weapon.
And so if one saves a gun or doesn't want it to be matchable to a bullet at a crime scene, one needs to deliberately change the ballistic markings the gun makes. Which is quite easy.
Driving a file through the barrel of the gun and changing the "rifling" inside the barrel will cause a change in ballistic markings.

So if one wants to use a gun for crime it is recommended that one removes the serial number on the gun, and leave no DNA or fingerprints, this means you can throw away the gun if needed.
And if you plan on using the same gun at different times without wishing it be connected to different crimes, then you should change the "rifling" inside the barrel after each use or crime.
If you plan on abandoning the gun remember, no DNA or fingerprints, and remove the serial number. Ideally also change the rifling on the gun. Such that it cannot be traced to you and it cannot be connected to a crime.

One is not bound to removing, one can also create indentations. In this case you simply chisel lines over where the serial number was, so even if there were some indentation left of the numbers they are covered by your own indentation.

Lastly there's a new and evolving option to having untraceable weapons and that is 3D printed weaponry. Today one can easily 3D-print certain gun parts and buy or make other metal parts.
Basically it is easy to construct an improvised firearm, and these are of course untraceable as they do not have any serial number and no history from licensed manufacturers or sellers.
And again one can change the barrel or rifling if one wants to obfuscate for what crimes a gun was involved in.

Alibis

At a basic level, an alibi is a testament to not being at the scene of the crime at the time the crime was committed.
Alibis are powerful tools to erode suspicion and avoid prosecutions. These can be fabricated but it is hard to fabricate a working alibi.
What makes for a good alibi is a natural, simple, multiply attested and independently attested alibi.

Natural

The alibi needs to be natural. This means that it fits your life and character. It should be mundane and a natural fit, rather than extraordinary and odd fit. As extraordinary and odd events are usually considered unlikely on their face, which means investigators will not find it believable unless you have good testimony for it.
An example of an unnatural alibi is when:
Anti-social loner criminals claim they were at a party during the time of the crime. The authorities usually have enough psychology understanding and testimony from friends and relatives to determine that someone is anti-social, and that the alibi is unfitting.

Simple

The alibi needs to be simple. This means that it should not be too convoluted, complex and detailed.
"Ad hoc" is latin for "for this", and it is used to express when something appears fabricated, improvised and convoluted.
The effect of something being "ad hoc" is noticed in lies that back up lies. As each lie is made up to cover a new problem, the overall story becomes convoluted and unusual. And the more specific and convenient the lies are to explain a problem, the more the overall story seems fabricated. It seems made up "for this" purpose (lying about something).
So there's the problem of having an answer for everything which is something liars often try to have. But then there's the problem of not having a good answer prepared.
This creates a balance for alibis between; detailed and rehearsed, and, simple and improvised/spontaneous.

When giving a simple and improvised alibi, the advantage is that the “recanting” of it seems more believable. Because the person thinks about their answer (as if remembering) and the simplicity makes it less committal to believe.
When giving a detailed and rehearsed alibi, the advantage is that the story avoids contradictory information and details can make it seem like a person was actually there.

So how does one balance this?
How detailed and rehearsed should the story be, and how simple and spontaneous should the story be?

Firstly a method to make a good simply story is:
Start constructing the scenario, ex: a house party. Then start making the narrative, to help this one can take inspiration from actual examples of the scenario, ex: including events of actual house parties.
Then filling in information needed to make it into an alibi.
The reasoning is that you create a simple narrative and try to fit the needs of the alibi into it.
Rather than creating a narrative based on the needs of the alibi, often making the story convoluted and fixated on weird details.
The story becomes weird if all the details one remembers is related to it being an alibi, especially if the details “stack up” in explaining each other, like lies to explain lies.
The story becomes simple when you remember it like how you remember other similar scenarios, and there just happens to be a few details making it an alibi. Makes it seem less focused on being an alibi.

A good rule of thumb is that:
You should make the story similar to real scenarios, and you should remember enough/similar things to real scenarios, and the details which make it an alibi (ex: checking time, movements, etc) should be like other things in the story (ex: checking phone for time rather than seeing it on the big ben, walking somewhere rather than getting a lift by a random).

Another thing when making up and rehearsing the alibi, is that different people have different perspectives and should remember different things. Usually alibis seem strange when two people remember exactly the same things. Investigators will often then ask how a person got the information, to see if they have a good explanation for how they know it, if they don’t it seems rehearsed. If you actually remember something you should remember how you came about that thing.

Lastly, it is important to learn to say “I don’t know” to many questions. One needs to remember the scope of the alibi and not try to explain everything, and that means leaving some things unexplained. When investigators start asking you about the intentions of another, one can easily start explaining too much, seeming like a mind reader, instead of just saying “I don’t know” “He didn’t tell me” “I didn’t ask him”

Multiply Attested

Having many people give a similar account makes it more likely true and believable. But one should be careful to avoid the previously mentioned problem, of having different people remember the same things.

Independent Attestation

This is the strongest help to make an alibi believable.

Even having a story multiple attested by a bunch of people related to you is not as strong as having independent attestation.
The reason is that the multiple attestation could be due to conspiracy while the independent attestation could not be.

This might also be the hardest thing to fabricate. Some criminals hire people to lie for them to help build the alibi.
The best thing would be to have “under the radar” friends who can serve as “independent” attestation.
What is meant is that you should have trustworthy friends/conspirators who there is no information to support your prior friendship or knowledge of each other.
The story should be that you became acquainted at the moment of the alibi, and that you didn’t know each other prior, that creates independent attestation. But to do this there needs to not be any information like: Having gone to school together, gone to the same church, same sports club, cell phone records, etc.
This for obvious reasons is something that only works once, and is done in absolute necessity.

DNA and Fingerprint tracing

To avoid transmitting DNA or fingerprints you should use plastic gloves and ideally cover your mouth and hair.

If you want to guarantee leaving no DNA, fingerprints or any cloth particles, leaving no trace at all, I recommend wearing a surgical outfit, to improvise this one could just tape plastic trash bags around some clothes, and wear plastic gloves, face mask and some hat.

To remove DNA or fingerprints from an item you need to wipe the item over with a solution.
The problem is that different solutions fit differently DNA or fingerprints.
Fingerprints consist of fat and oils which are destroyed by alcohol.
DNA on the other hand is not destroyed by alcohols but is fully destroyed by bleach.

So if you want to remove DNA and fingerprints from an item you might need to do two “wipe overs”.
First you wipe with a rag with alcohol (ethanol, acetone, isopropanol, etc) and this removes the fingerprints.
Then you wipe with a rag with bleach as this removes the DNA.

So wipe over items with rags doused in alcohol and then bleach, or bathe them in alcohol and then bleach.
Always do the alcohol treatment separately from the bleach treatment.

NOTE: Do not mix alcohol and bleach; it can cause dangerous fumes.

Again if for example you are going to use a gun for crime and want to be able to abandon it:
First you have removed the serial number.
And then you are not sure if there's dna or fingerprints.
First you wipe it over with a rag of ethanol. Which removes fingerprints. And let it dry.
Then you wipe it over with bleach. Which removes DNA.
And always make sure to have plastic gloves on when doing anything with the gun, including when cleaning it.

Don't breathe heavily on it or leave saliva on it, if you don't cover your mouth.

I also recommend these steps when you build a bomb of scrap material.
Wear plastic gloves, mouth covering and hair covering.
Wipe over the items.
And then build and send.

Creating New Identities and Fake ID Cards

Creating a fake ID card is just that. It involves making something that looks like an ID card. The best is having a point of reference, when making these.
One can also try and buy these from the dark web, you provide them a picture and they do the rest and make up a false person.

It is important to remember that these are not official documents and cannot last past any cross reference.
So a fake ID might be enough to get into a bar, book a hotel or motel, receive packages, etc

But if you need an identity that can be used for setting up credit cards, fraudulent loans.
Basically if you need to change identity or an alternative one there is really only one method that has worked.
It is called ghosting.

Ghosting is when you find a dead person who was born close to you. And you assume their identity, and then one looks the same age of the identity assumed.
The technique usually involved searching graveyards or obituaries for a person and gathering all the information available, and then going to the authorities and asking for the birth certificate.
With the birth certificate and social security number you can then start asking for legal documents and then you have a new identity.

The problem is that it is highly suspect and dangerous, sometimes they find out that the person is dead that you are trying to assume.

There's also the other problem that many people may attempt to assume the identity of the same people, and so you might share the identity with another criminal.

The other way to do ghosting is to find a junkie area, where people abuse powerful drugs and are homeless.
These people have their ids with them in public and when they die their deaths are not properly reported.
The best way to go about it is to find a homeless drug addict and offer to buy his identification papers, one can replace the picture with yourself.
Or you simply steal (and/or kill him) for it.
If you kill him then hide the body in such a way it won't be discovered unless the body has become unidentifiable.

Transactions

Transactions in modern society have different levels of traceability depending on what currency is used.

The worst type is using your own real credit card information. Pretty much all information about the transaction who made to who, when it was made, what it was made for and how much. And this is logged forever. It is very common for the authorities to find a person had made transactions buying items relevant to the crime.

I strongly recommend not purchasing anything with your own credit card information unless it is something very normal and general.
You could for example buy lab equipment with your own credit card, but do not buy the precursors for explosives with your card as that alone might get you in trouble.
Buying precursors for explosives with a credit card could get you flagged or be evidence of planning to make explosives for bombs.

A slightly better option is using a stolen credit card. One can then purchase anything questionable and order it to for example an abandoned house or address, and then go there later to pick it up.
If doing this make sure to use vpn, or tor, etc, and/or any other internet anonymizing efforts so that you are not traced in another fashion.

An even better option is cash. Cash transactions are not bound to a person like a credit card is, and won't be flagged or logged when certain items are bought. Though the receipt may be saved by the seller, or security camera footage of you buying the items.
These are very small problems, if you spread out your purchases and do them at different times, and let enough time pass before your criminal acts.
Then the security camera footage is likely gone, and there's no real pattern to purchases.
And it is much simpler and legal to use cash than to steal a credit card, and use it without being caught.
Furthermore, usually a credit card gets blocked once they figure out it was stolen.
You need only be able to buy the products in person.

The best option is the cryptocurrency of Monero.
There are probably other safe cryptocurrencies but the best one available is monero.
Cryptocurrencies allow you to purchase online and good ones, like Monero, use encryption and prevent tracing.
The only disadvantage is finding sellers who accept Monero.

This is a website that offers all the important information regarding monero. How to get it, use it, exchange it, different businesses that accept it, mining, etc.
https://monerica.com/

https://www.getmonero.org/

https://www.coincashew.com/coins/overview-xmr/guide-or-how-to-run-a-full-node

Plausible Deniability

Plausible deniability is simply keeping the circumstances such that one can within reason deny the responsibility of anothers actions.
An example is paying another person to kill your enemy, this way you are creating plausible deniability. It would be very reasonable that you had your enemy killed, but since it is not unreasonable that the killer acted alone you are less likely to be convicted.

For any crime or communication the simplest way to create plausible deniability is by using middle men. One might think for example that having a middle man in drug trade, only increases prices, reduces purity, but it does come with an advantage, which is they are the ones taking the risk doing face to face selling.

So when it comes to drug trade, the ideal is to have a few middle men who you sell to that act as the street dealers. This might reduce your profits, but you avoid a lot of work and risk by selling on the street.

You only want trustworthy people around you, and let them be middle men on smaller issues. On important issues it may be better to have as few involved as possible.

For example leading a drug operation, here it makes sense to create middle men. The reason is that it is better to do one big drug deal rather than many small ones with approximately the same risk of getting caught. So you want to do as few transactions as possible to trustworthy people and let them sell it on. Compare this to leading a robbery. Here you almost always want direct communication with every member. Any middle men would be an unnecessary risk of giving too much information away.

Use middle men wisely to create plausible deniability.
Avoid taking many risks if you can do it fewer times instead.
But make sure that the middle men don’t add more risk than they contribute.

Of course the best way to create plausible deniability is to only associate with reliable people. Fanatics, loyalists to the cause, those who care about honor.
If every criminal in an organization always used the right to remain silent and avoided contact with other members, then it would almost be impossible to take down a mafia.
The authorities would need evidence on every single member without testimony or observable connections between them.
Again the organization becomes much stronger if every member doesn't say anything and doesn't seek contact with anyone.
And if there are middle men who also do this.

Disposable Communications

These are methods of communications that are attempts to be anonymous to some degree.

Face to face

Face to face communication is good to use when there should be no documentation on what is said. If one is sure there are no one listening in and you are alone, then face to face communication is a good option. But if you suspect you are being watched you should try and avoid really any communications because you are just building the picture of the network for the police.

Notes

Another way to communicate is to make notes and burn them.
If you use cryptology (encryption and decryption system) then you can communicate with letters, or by invisible ink.

Invisible ink can easily be bought or made at home.
For example, writing your message with a cotton swab with lemon juice or milk on paper and then drying it will leave a message which is visible when the paper is held close to a lamp or candle.

One can also use pencil indents: you place a paper on top of another. Then write your message and remove the top paper, the bottom paper now has a message indented into it. And now one simply needs to shade the paper with a pencil to retrieve the message.

So note writing using cryptology and invisible ink or features makes note messaging possible. This is in fact how prison gang leaders can easily order hits from prison even though every letter is scanned.

Email generators

These are websites that offer a temporary email address, which is suitable for getting past email verification processes by websites.

Phone number generators

There also exists a variant for phone numbers, though these are often already used up, and the unused numbers are behind paywall. So if you have money to spend you can definitely get a temporary number.

Burner phones

A burner phone is a phone with a prepaid sim-card and phone number. Usually it works only for a period of time.
I recommend buying those that have removable batteries because then you can connect and disconnect from cell towers at will and avoid the burner phone being traced.

This phone should be your secondary extra phone with your criminal contacts. And this is the phone you use if you suspect the police are investigating you. You can safely warn everyone else, and then “lay low” without worrying about providing any information to police.

And if you need to destroy it look at the previously discussed chapter “phone/computer extraction”.

Burner Computer

A burner computer is really just an extra computer in which you use in an anonymous fashion, and where you concentrate your illegal contacts and activity, separating your normal life and criminal life.
To use a “burner computer” I recommend reading up on the following chapter “Anonymous Internet Activity”.
One needs to use the computer along with anonymizing efforts and programs like Tor.

This is also a safe manner to warn your co-conspirators if you are being investigated. And is destroyed as previously discussed at “phone/computer extraction”.

Anonymous Internet Activity

Proxy and Proxy Websites

Proxies or proxy websites work as intermediaries and are quick and easy measures to bypass restrictions anonymously.
For example in schools, universities, work, etc, there can be websites or functions that are blocked, and proxies help bypass that and provide some measure to hide your identity.

But it is important to remember that proxies are only intermediaries and don't use encryption, and so the internet traffic is not hidden from school, work, etc.
And proxies don't work for apps.

I mention this option if you are using your own internet or public internet at a place you don't often visit. For example, like a fast food place or cafe. If you plan on researching you can do so in public spaces.

But this is only a quick option. I highly recommend using VPNs instead.

VPNs

VPNs are like proxies as in it works like an intermediary, but it also uses encryption which hides the content of the internet traffic.
If you are going to do research topics regarding criminality then I highly recommend using VPNs, especially at public spaces you visit often.
Any questionable internet activity you plan on engaging in at school, work, university, restaurants you visit often, etc, then you use a VPN.

VPNs exist for free, usually with limitations, but you can also pay for VPN services.

Overlay Network; Tor, I2P and Freene

Overlay Networks are networks which have many intermediary steps and use layers of encryption. This is the safest option.
If you use an overlay network like Tor, there's no need for a VPN. In fact technically using a VPN and Overlay Network can be bad because it creates an unnecessary middle man who reads your internet activity.

The idea is the overlay network creates many layers of intermediaries and encryption. And at each intermediary, that removes a layer of encryption, it states which is the new receiver of the message.

This is the best and most secure option for anonymous internet activity.
And this is highly recommended for anonymous communications and transactions via the internet.

Tor

The Onion Router (Tor) is a free and open-source software for enabling anonymous communication.
It does so by directing internet traffic via a free, worldwide, volunteer overlay network that consists of more than seven thousand relays.

Using Tor makes it more difficult to trace a user's Internet activity. Tor protects personal privacy by concealing a user's location and usage from anyone performing network surveillance or traffic analysis. It protects the user's freedom and ability to communicate confidentially through IP address anonymity using Tor exit nodes.

Onion routing is a technique for anonymous communication over a computer network. In an onion network, messages are encapsulated in layers of encryption, analogous to the layers of an onion.
The encrypted data is transmitted through a series of network nodes called "onion routers", each of which "peels" away a single layer, revealing the data's next destination. When the final layer is decrypted, the message arrives at its destination. The sender remains anonymous because each intermediary knows only the location of the immediately preceding and following nodes. While onion routing provides a high level

of security and anonymity, there are methods to break the anonymity of this technique, such as timing analysis.

In telecommunications networks, a node (Latin: nodus, ‘knot’) is either a redistribution point or a communication endpoint. The definition of a node depends on the network and protocol layer referred to. A physical network node is an electronic device that is attached to a network, and is capable of creating, receiving, or transmitting information over a communication channel. A passive distribution point such as a distribution frame or patch panel is consequently not a node.

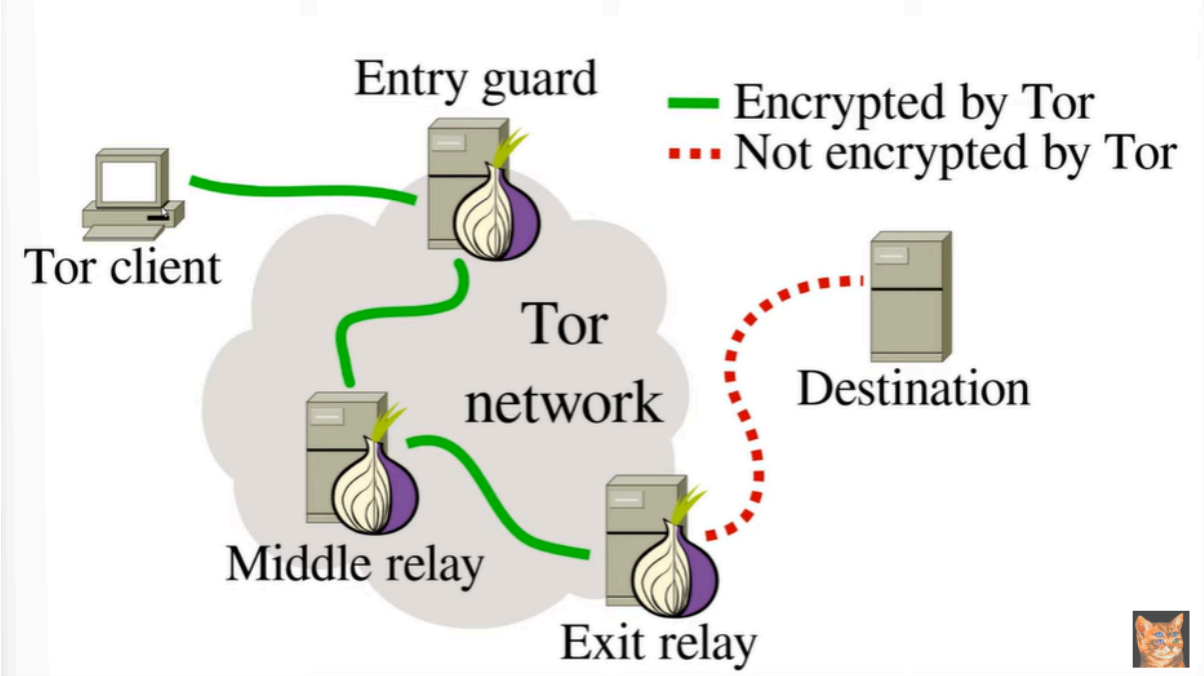
In data communication, a physical network node may either be data communication equipment (DCE) such as a modem, hub, bridge or switch; or data terminal equipment (DTE) such as a digital telephone handset, a printer or a host computer.

A relay network is a broad class of network topology commonly used in wireless networks, where the source and destination are interconnected by means of some nodes. In such a network the source and destination cannot communicate to each other directly because the distance between the source and destination is greater than the transmission range of both of them, hence the need for intermediate node(s) to relay.

Tor accomplishes two things:
1 It encrypts your messages to make it private.
2 It communicates the messages to random nodes who only know the next node who should receive the message. This makes it so a node only knows who it receives the message from and who it is being sent to. Making the first node only aware of who the messenger is, but not who is being communicated with. And the messenger is anonymous to all other nodes and the end receiver.

Tor Introduction in Detail

First look at how the message is communicated.



Tor in this manner works the same as a proxy and vpn. It hides your ip-address from the websites you connect to. Because the destination can only see what the exit relay is saying.
The end destination is only communicating with the exit relay and thus only knows that relays IP.
The IPs of relays in the tor network is public knowledge, so the destination knows at best that someone is communicating via the Tor network.

A regular proxy and vpn only have one relay. Meaning the client communicates to the relay and the relay to the website. Tor expands on this by having three relays.
Using only one relay means that whoever operates the relay can see all of your traffic. They can see your IP address, what information you're sending, and to whom you're asking the information to be sent to. So you are not anonymous or private to the proxy service.
Having several relays increases anonymity, because to be able to see all the information of the traffic, it is needed to operate all three relays.
The entry relay knows your IP and which is the middle relay.
The middle relay knows who the entry and exit relay are.
The exit relay knows the middle relay and the destination.
None of the relays alone knows who is sending what information to whom. But all three together know who is sending what to whom.
This means that the Tor network is less likely to be compromised by bad actors (hackers, authorities), because it requires the compromising of three relays instead of one.

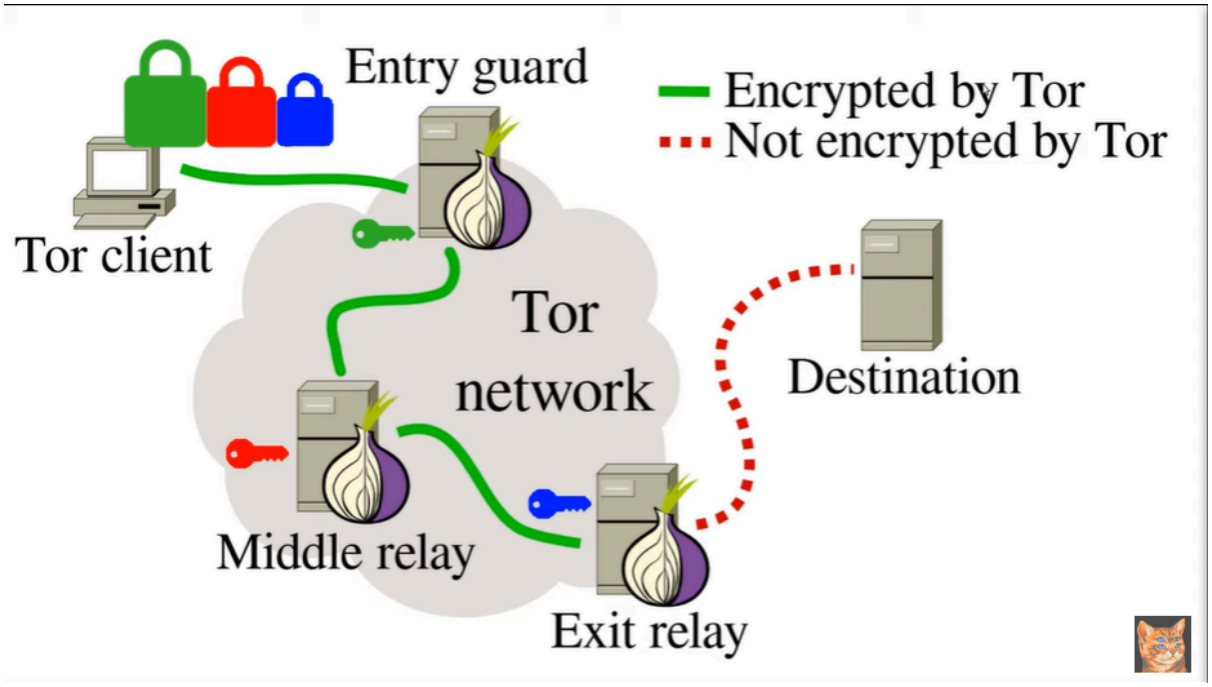
These relays are also often found in different nations. Which means that for one single government it is hard to compromise all three relays.

The communication through three relays help hide who is behind the traffic.

But the communication via relays does not hide what is being said. And part of the message is which relays and destination the message is going to be sent to.
This means that if any relay is compromised, it is possible to see all of what is said, even though the information is not necessarily sent by the messenger.
So the relays can indirectly see all of the traffic. They don't necessarily communicate with the messenger and the receiver. But they can see what is said, and to whom the message is sent.
Therefore Tor also uses encryption to hide what is being said.

The information sent between relays can be paired up and shown to be the same message. In that case knowing what is said can be used to figure out who said it.
If the message the receiver receives is identical to the message sent by the messenger, then it is known who the messenger is.
It is therefore needed to hide what is said as well. Otherwise one could simply pair up the message to the entry relay and the exit relay to show who is saying what to whom.

Now look at the encryption.



The message is encrypted with three layers of encryption, which requires three keys to be decrypted.
The encryption hides what is being said and thus makes the communication private.

Regular browsers will connect to a website via “https” and encrypt the message with “SSL version 3”.
This is one layer of encryption. Which can be decrypted by the website owner. Which means that a compromised website would know what is being said, and if no relays are being used, who is saying it.
And if one uses one relay and one level of encryption, while the website would not know who said what, the relay operators would.

That’s why the Tor network has three layers of encryption coupled with the three relays.
This means that all three relays need to be compromised to see what is being said and by whom.

The message or “package” sent from your computer has three layers of encryption.
The entry relay has the first key for the first and outermost encryption. It decodes the message and then sends it to the middle relay.
The middle relay has the second key for the second and now outermost encryption. It decodes the message and then sends it to the exit relay.
The exit relay has the third key for the third and outermost encryption. It decodes the message and then sends it to the destination. The message is fully decrypted by the exit node.

The destination can respond with a message that will be encrypted in the reverse order.
The exit relay receives the message and encrypts it and passes it on to the middle relay.
The middle relay receives the message and encrypts it and passes it on to the entry relay.
The entry relay applies the last encryption and sends the message to the client.
The client has all the keys and can decrypt the entire message.

The entry relay only knows who the client and the middle relay is, and not what is said.
The middle relay only knows the entry relay and exit relay is, and not what is said.
The exit relay knows the middle relay and the receiver, and what is said.
The receiver only knows the exit relay and what is said.

Thus the Tor network hides what is being said and by who.
For anyone to know what is being said, they would need all three keys. Which means all three relays need to be compromised.
For anyone to know who is communicating with whom, they would need to operate or compromise all three relays.

It is also possible to connect to Tor through a bridge. Which is a relay node that is not publicly listed.
Which is useful in countries that suppress publicly listed relays to Tor.

Tor used to block all javascript functions by default. That's because javascript can be used to fingerprint someone whenever they visit a webpage. Today Tor does not do this by default because a lot of websites require javascript to function. But not most hidden websites will do this.
To block all javascript functions it is needed to change the settings.
First go to settings.
Then go to advanced settings.
Then choose the option "safest" for security. The option will list its feature of disabling javascript on all websites.
Again most hidden sites of interest will not use javascript, so that the visitors can be confident in their safety when visiting them.
Some other hidden sites might use javascript because they are trying to track you and in that case disabling javascript is recommended.

https://www.torproject.org/

DNM and Its guide

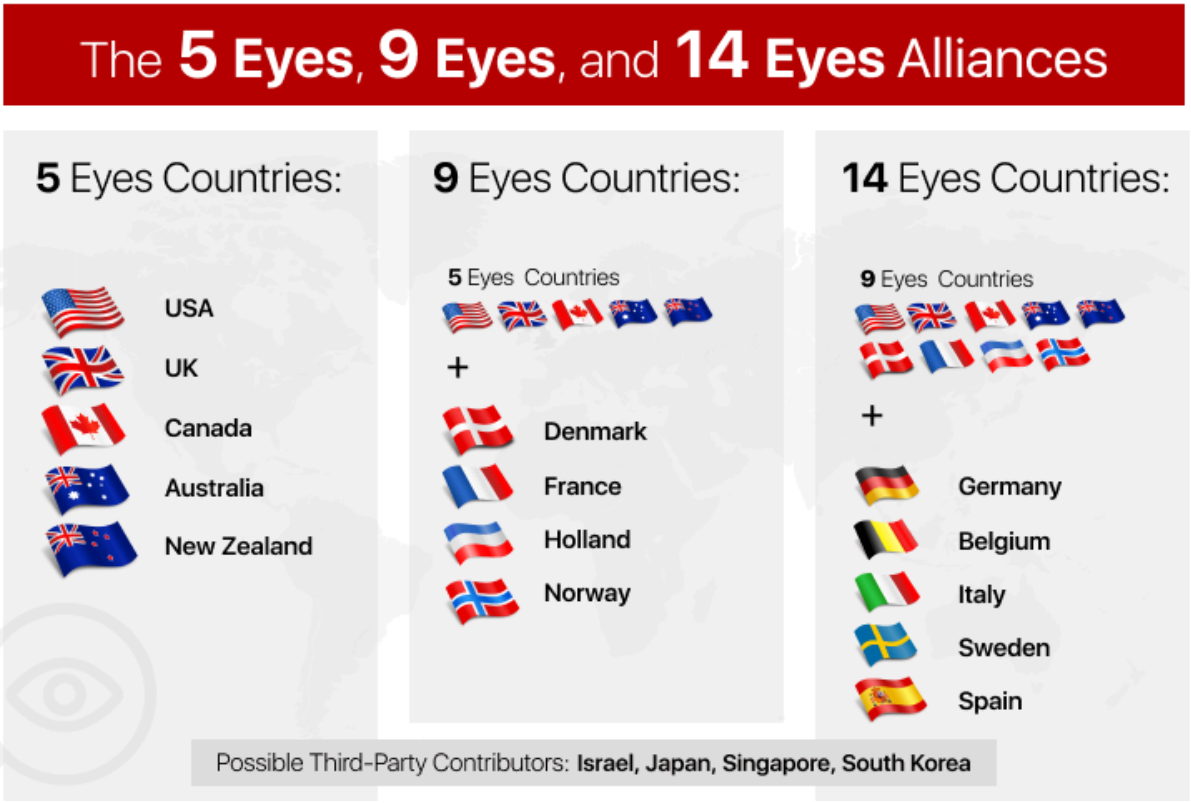
DNM stands for "Darknet Market". These are the famous black markets on the internet. Basically because you can use the internet almost entirely anonymously, by using overlay networks like tor, people then use this to sell things on the internet which would otherwise be illegal.
Because this topic is so complicated and detailed I simply link the "DNM Bible" which is a thorough guide that talks about how to best set up a computer and how to use Darknet Markets.

https://vaiyo.io/wp-content/uploads/2024/03/DNM-Bible.pdf

Furthermore, here is a link to the active markets out there:
https://www.dnmlinks.org/

Some important advice to remember when venturing into the "darkweb" or "darknet" is that you don't mix the internet activity on the darknet and the clearnet. Because that is what creates identifiable patterns. If you for example write certain things on politics in both the darknet and clearnet, that alone can be sufficient to match your darknet activity to you a real person on the clearnet.

I also recommend if you are going to host servers that you try to do so outside the "14 eyes".



These countries, including the third-party contributors, actively work all the time to find and shutdown darknet activity and work in conjunction sharing information.
I heavily recommend trying to keep your servers outside of their jurisdiction.

Virtual Machines

Virtual machines are software-based simulations of a computer that runs inside your actual operating system. And it has its own virtual hardware, operating system, files and applications, isolated from the real operating system.
Basically it is a computer inside your computer that is isolated.

The advantages of this is that it:
1 Helps protect against viruses. As a virtual machine that has been infected is usually able to contain the virus within itself.
It is often possible to take a “snapshot” which functions like a quicksave, and then if the computer is infected with a virus, one just restarts and achieves a clean state immediately.

2 Helps with anonymity on the internet. As it will create its own fingerprint and cookies on the internet which are separate from that of your host operating system.
Notice though that a virtual machine still uses your internet and will therefore have the same IP. You could and should then use a VPN or Tor along with a virtual machine.

https://v2-virtual-box.com/

Selling Stolen Goods

Selling stolen goods has different nuances to it.
Firstly one can sell a stolen good in parts or as a whole. Generally it is better to break and sell stolen goods in parts as this makes it hard to trace.

But if you are going to sell a stolen item as a whole I recommend doing so in an anonymous fashion.

If you sell to private buyers or a pawnshop, then it is not anonymous and I highly recommend you sell the stolen good in parts.

If you sell via Tor or Darknet Market, then you can sell it whole as long as you remain anonymous.

If you want to sell on online markets then it depends. Online markets like Facebook market place or other legitimate legal online markets.
If you have a system to remain anonymous, using VPNs, disposable emails, etc, then you can sell it whole.
If you cannot remain anonymous, you should sell it in parts.

Smuggling and Illegal Deliveries

Post Office Security measures

There are three main measures at post offices:
1 X-ray scannings.
2 Canine units
Dogs sniffing for drugs or explosives.
3 Manual inspections.
If a package is suspicious then it can be manually inspected by the post office.

To bypass measure 1, x-rays:

Involves packing items and hiding them inside for example electronics. Some even use dense material like lead to achieve this effect. But it is generally a good method to hide items in for example a toaster with many metal parts in different angels obfuscating any illegal metal items hidden in it.
Basically hide items in similar items. Like a drug powder, like cocaine, you can hide it in a protein powder bag.

To bypass measure 2, sniffing dogs:
Involves blocking the smell of the item by vacuum sealing.
And by placing masking odors, to mask the smell of the item. Things like coffee, spices, ammonia, perfume, etc.

Receiving Illegal Items

When you order illegal items from the darknet or you are going to receive illegal items there are different methods of receiving these.
Part of the issue is to receive these without compromising information about yourself, and trying to keep plausible deniability.

To do this people aim to order items to residences they don't live at and by using aliases.
So one gives a fake name to an order, and ideally has a fake id card with that name.
One orders to the address of a vacant house, airbnb or rented mailbox.

Another way to do this is "dead drops".
The darknet vendor can hide the package in a public place and then give the location to it later.

Lastly, a buyer can pay another person to retrieve the package for them, understanding that they will not ask any questions, and if law enforcement asks they don't know anything.
Important here is that the third party package collector warns if the police want to set up a sting operation, meaning wait at the home of the person who gets the package.

Weapons

When delivering weapons over mail or similar ways there's three ways to do it in a "legal" way. A way which exploits some loophole.

The first is converting a weapon into a non-weapon state. Meaning it technically doesn't count as a weapon when you deliver it and then the receiver can simply convert it back.

The second is shipping individual parts of a weapon. With this method one could in theory send a bulk amount of each part of the weapon and thus you have sent a bulk amount of weapons.

Thirdly if you falsify an “end-user certificate” and of course have any other legal requirements for exporting or importing, then one could in theory do weapons deliveries of almost any type.

I mention these methods some more realistic than others because they all have been done and are possible but it heavily depends on the circumstances, where you live and what security is applicable. So one should do serious research before trying any of this, and ideally using a fake identity so even if it doesn’t go through you are not thrown in jail the rest of your life.

Escaping Prosecution

The best way to avoid prosecution if one is going to be arrested is to flee to a country without extradition laws.
Make sure to research beforehand what countries don’t have extradition laws to the country you are fleeing from. And that they don’t extradite for the reasons you are fleeing.

If you are arrested and under custody it is important that your lawyer tries to have you not be considered a “flight risk” because this makes it impossible for you to get out on bond. Your goal is to get bond, pay it and then try to escape, ideally unofficially for example by crossing into a neighboring country without announcing it legally.

If you are beginning to suspect that you are under surveillance and or being investigated, one option is always to take a random vacation.
What is meant is that you go to a country which doesn’t extradite, and then you stay there for a while waiting to hear from your associates to see what happens.
An example of this is:
You notice a car that follows you in circles or all day, a few days in a row, you look up the license plate and it is a police car, so you immediately go home and hide all incriminating evidence in a bag and in the wall. And you announce to your co-conspirators via a burner phone that you take a break from criminality.
Eventually a family member warns you that the police came asking questions about you, and they asked about some information they had about you. You realize that the information will have you convicted, and that they are looking for you to expose others or give a confession.
So you take all the incriminating evidence and whatever else you need, and drive over to a neighboring country at night, without being followed.
You then go to an airport and fly to a non extraditing country.
Your family then informs you that they wanted to arrest you but you weren’t home, so they came looking for you.
In this case you stay in the foreign country until the statute of limitations runs out for your crime.

Another example which is maybe one of the most likely:
Is that your co-conspirator was arrested, and he or his lawyer calls you to inform you, on your burner phone, that he was arrested and that they will investigate/arrest you as well.
So you immediately go to an airport and fly to a non extraditing country.

Basic Health, Exercise and Fighting

Diet and Training

Certain criminal acts and especially paramilitary activity require physical prowess. And this is not hard to achieve with discipline.
A soldier trains everyday. And it doesn’t need to be max effort everytime. Sometimes it can even be so simple and just running or walking some distance a certain day.
But if you are active every day, gym, boxing, running, swimming, walking, etc, then naturally your body will quickly become suited for a soldier's life.

Diet:

Your diet should depend on your fitness goal.
If you are simply trying to lose fat/weight, then you are trying to eat a calorie deficit, meaning you burn more energy than you consume.
If you aim to build muscle you want a slight calorie surplus.

Protein: 1.6-2.2 g per kg of body weight. (per day)
Carbs: moderate to high
Fats: healthy fats, 0.8-1 g per kg of body weight (per day)
I also suggest drinking a lot of water.

Training:

One should train in an "all around" manner, generally improving fitness. The improvements in some areas will sometimes help you improve in other areas. Meaning it can help you avoid plateauing your progress. Though you should naturally expect that eventually you will start plateauing, for you to keep progressing you would need more advanced training programs and effort.
But I suggest you reach your plateau and slowly increase in general, or focus on a particular area more if you have some talent there.
Not everybody is suited for long distance running, and those suited for long distance running are usually not suited for fast short distance running.
There's often a distinction made between people that generally some are good at endurance tasks, and some are good at explosive strength tasks.
I suggest one trains all types of fitness and specialize depending on their talent, goal or work.

Strength

A simple strength routine that works a long time is 5x5:
5 sets and 5 reps for main exercises. Non-main exercises can be 4 x 8 or 4 x 12..
And you can have alternate days with 4 x 8, 4 sets and 8 reps.

Bodyweight exercises also can increase strength, to help achieve that you simple make it harder, add more weight or remove more support.
Like instead of doing regular pushups, one can do handstand push ups or against the wall.

Endurance

Bodyweight exercises, boxing, wrestling, etc, these increase your muscular endurance.
Running, swimming, cycling, walking, these train your cardiovascular endurance.

And it is important to train both.

A full body program to follow is the navy seal calisthenics program, go to appendix 1 to read it. The only shortcoming might be the lack of pull-ups in the training program.
There's also the Murph challenge which is good training.

Another good work out is the "Murph challenge":
3.5km run
300 squats
200 push ups
100 pull ups
3.5km run

(I recommend starting with "half-murphs", meaning you do half of each:
1.75km run (or 3.5km and no run on the end)
150 squats
100 push ups
50 pull ups

And increasing to full Murphs if halves no longer require much rest)

Agility

Bodyweight exercises, boxing, wrestling, etc, these are good to increase your agility, explosiveness, and skills.
To make bodyweight exercises more explosive I suggest doing explosive reps, meaning they are fast and use much force. You can add weight to make it harder, or you can do movements where you apply more effort than necessary.
Like for example you can do jump squats or clapping push ups, etc.

Basic Hand to Hand Combat

Army Manuals on hand to hand (HTH) combat stress the importance of:[1]

1 Dominant body position.
"The primary goal in any hand-to-hand fight is to gain and maintain the dominant position."

[1] U.S. Army Hand-To-Hand Combat
Department of the Army

Dominant positions are those that allow you to strike, submit or disengage, but your enemy has limited options.

In grappling there are several positions that are dominant which you strive for:
Mount, side control and back control.

2 Posture, movement and striking technique:
Good posture and movement allows you to move more safely and be more resilient to a takedown, and proper stance and movement also allows you to move and punch.
Drills, sparring and shadow boxing, can be combined to learn basic boxing. How you stand, move and punch effectively.

3 Wrestling:
Being able to close the distance, clinch techniques, takedowns, escapes and throws.
Wrestling allows you to take the fight to the ground where you can secure a dominant position.

4 Aggressive behavior:
To win a fight is about attacking until the opponent is neutralized. It is most important to keep the pressure up and be fast and explosive. It is very important to be able to push through pain when fighting. Rather than be careful and precise, and try complicated fancy moves, just do simple moves and keep applying them to pressure the enemy.

In summary you want to practise:

Strikes: punches, kicks, knees, elbows.
Takedowns: single leg, double leg, hipthrows, etc.
Submissions: rear-naked choke, guillotine, armbar, etc.

And it is highly recommended you practise by sparring. And that you join a sports club.

Active club is a good organization for this. Otherwise join a boxing, wrestling, mma or bjj club.

First Aid

CABC.DE
Critical bleeding:
First check if there's any important bleeding. You do this by quickly dragging your hands and scanning the body of the patient. Make sure to go under the shirt and pants of the victim.
Stop any important bleeding by either stopping the blood flow or covering the wound, or by doing both.

Airways:
Make sure to lean their head back slightly against the ground, opening their airways, and leave their mouth open.
Double check to see that there's nothing in their mouth and that they haven't swallowed their tongue.

Breathing:
Make sure the patient is breathing properly. If not perform CPR.

Circulation:
Make sure their heart is beating and they are warm and preserve heat. If their heart isn't beating properly then perform CPR.

Drugs and Disorientation:
Check if they have any paper showing a diagnosis or condition and if they have any medicine which needs to be administered.

Evacuation:
If there's nothing more to do then start trying to evacuate them.

This is a solid procedure that can be used in the field by a soldier as well. To stop blood flow you use a tourniquet and bandages to cover wounds.
One can also improvise a tourniquet with rope and a stick.

Reproduction

Sadly as the birth rates for white people are very low, and there are elaborate conventions of society or religion that makes it hard to start a family early. I just wanted to mention some considerations, at least for the pious readers. Most importantly, search for traditional religious organizations like SSPX or Opus Dei, etc, to find a woman, these are obviously better women and more likely to marry early.

If you are a nihilist and don't believe in objective morality, then for you any measures are available to ensure procreation.

For the pious reader there are a few nuances:

1 As young as 16 and 14 (men and females respectively) one can enter a valid marriage.

"Canon 1083:

§1. A man before he has completed his sixteenth year of age and a woman before she has completed her fourteenth year of age cannot enter into a valid marriage.

§2. The conference of bishops is free to establish a higher age for the licit celebration of marriage."[2]

Notice that the bishops may decide what is licit, but not what is valid.
So a priest could validly marry 16 year olds, and doing so would not incur an automatic excommunication.
It might be hard to find a willing priest, but it might be possible especially in traditional circles.
In fact the priest could hold the marriage in private with a witness, and simply not report it to the church.

Naturally I recommend people marry young to have as many children as possible.

2 Natural marriages

A natural marriage is a marriage between a baptised and non-baptised person, or two unbaptised persons. These are also completely valid like a sacramental marriage in church, and a natural marriage automatically becomes a sacramental marriage when all parties are baptised.

The rules for what constitutes a natural marriage is the same as that of a sacramental, except it needs not be observed by the church.

It requires:
Consent by both parties.
No close blood relationships.
No prior existing marriage bond.
No sterility.
Openness to children
Life long union.

And since it doesn't have or use proper form, it doesn't need a priest and witnesses.

So as a christian you can marry a non-christian alone.
Or as an uninitiated believer (unbaptised) you can marry whoever you wish without a sacramental marriage.
And then once you are all baptised the marriage automatically becomes sacramental.

Combine this with the valid marriage age, one can marry young without any witnesses completely validly.
So if you are a young catholic or unbaptised believer, one option is a natural marriage, if you want a family fast.

[2] Code of Canon Law - Book Four - Chapter 3
https://www.vatican.va/archive/cod-iuris-canonici/eng/documents/cic_lib4-cann998-1165_en.html#CHAPTER%20III.

Protection and Equipment

Identity protecting clothing

As discussed earlier, public surveillance is a factor which needs to be regarded for all crimes committed in public, one also needs to consider dna; fingerprints, shoeprints, and in general the possibility of witnesses.

This culminates in ideally one wants to cover their face, mouth, hands and have unidentifiable shoes.

To cover the face, mouth and hands are very straight forward. Popular choices among criminals are ski masks, balaclavas, leather gloves, etc.

But to create shoes that don't leave traceable prints involves changing the bottom of the shoes, the simple way to do that is to use a file or sandpaper, though make sure to remove loose bits.
The small loose bits can be cleaned off by washing and using a towel.

But to achieve maximum identity security with essentially no risk of leaving any DNA then one should use a surgical outfit or hazmat suit. Something that covers the entire body.
This should be done on very important and difficult jobs, like executions in day time. The police will in these investigations often have a lot of time and resources to search the entire crime scene which is often immediately known.
So an appropriate way to do such a crime is wear simple clothes with the dna proof surgical outfit on top,

An example of correct clothing by the RAAD.
One can also clean their outfit before using it. One dresses up and quickly cleans it with a bleach rag.

Combat Equipment

Uniforms should use camouflage, along with boots and head covering like a cap. You should look for those with many side pockets.

Tactical vests often have systems to add or remove pockets to make them customizable. Depending on the environment you will be fighting in you should prepare your vest differently.
In general when fighting in forests or terrain, you want less protective equipment like bulletproof plates. Bulletproof plates add weight and don't do much, as much of the time is spent laying down. In fact I would even suggest one wears a light helmet or none at all. It is important to keep the weight low for mobility and to make room for ammunition.
In more close quarter combat as expected in bunkers, trenches, buildings, urban areas, then maximize protective equipment. It is not as important to be mobile, because you will be moving slowly and each combat situation can last much longer. Further you stand up a lot and thus risk getting hit in the chest.
So wear heavy bulletproof gear like, plates, helmet.
The North Hollywood robbers had so many improvised bullet proof plates all over the body, the police at the time with only pistols available couldn't hurt them without a direct headshot.

I strongly recommend if attempting bulletproof plates you try making equivalent protection for other body parts. It would definitely be an advantage in an initial fight with police who often only have their pistol immediately available. But note the police in modern times do have and use higher caliber bullets.

Light Vest: (fitting for light infantry and fighting in the terrain.
5 x Magazine pockets (two magazines per pocket)
Dump pocket (for emptied magazines)
Universal pocket (hearing protection, compass, plastic pocket for the map) (and for general items you have)
Grenade pocket (two grenades per pocket)
Tourniquet pocket
Radio pocket
Medicinal Pocket (spaceblanket, hemostasis, “halo”/preassure bandage)

Heavy vest: (fitting for close and slow combat, ex urban areas)
4 x Magazine pockets
Dump pocket
Universal pocket
3 x grenade pockets
Torniquet pocket
Medicinal pocket
2 x bulletproof vests
Radio pocket

The helmet that goes along with combat gear should have a mount for opticals like night vision, and a mount for active hearing protection.

Night vision goggles usually can be mounted on the helmet or rifle. I recommend for battle that there is one of the goggles on the rifle, as this allows you to aim much faster. Rather than trying to line up the goggles on your head with the sights on your weapons, since they could already be lined up, if you just mounted the goggles on the rifle prior.
The only reason for you to have both goggles on your head is in non-combat situations like orienting in the forest or digging through your bag.

Active hearing protection is far superior to regular hearing protection, more so if you can mount it on the helmet. This makes it much faster to take them on or off, and you don’t need to keep them in the universal pocket.

Body armour has ratings, you need to look for bulletproof plates with the right rating to be sure it can protect against the expected enemy weaponry.

One can also make improvised body armour very easily. Melting aluminium and other metal like zinc, to create an alloy, and pouring into a proper shape, then duck taping ceramic plates onto it, will create a very strong body armour plate.[3]
I suggest trying different widths to find the right amount of protection without unnecessary weight.
This method is so common there are many youtube videos showing it.

I must add a small paragraph to explain:
When it comes to the strap on the rifle, I recommend keeping it tight generally. It prevents the weapon from hanging low and bouncing when walking.
You determine how tight the strap should be by; first hold the rifle against your shoulder like you would shoot, and then tighten the strap such that the rifle slightly pressures your shoulder.
Your body when holding the rifle to shoot, naturally pushes the rifle away from you, and this force is countered by the tension power in the strap when it is tight.
It is much easier to hold and aim a rifle for longer periods if the strap is tight, but obviously don't have it so tight that it cannot be held properly.

A spaceblanket is a blanket which is given to a person who has suffered blood loss and it helps keep their body temperature up, which is normally lowered by blood loss.

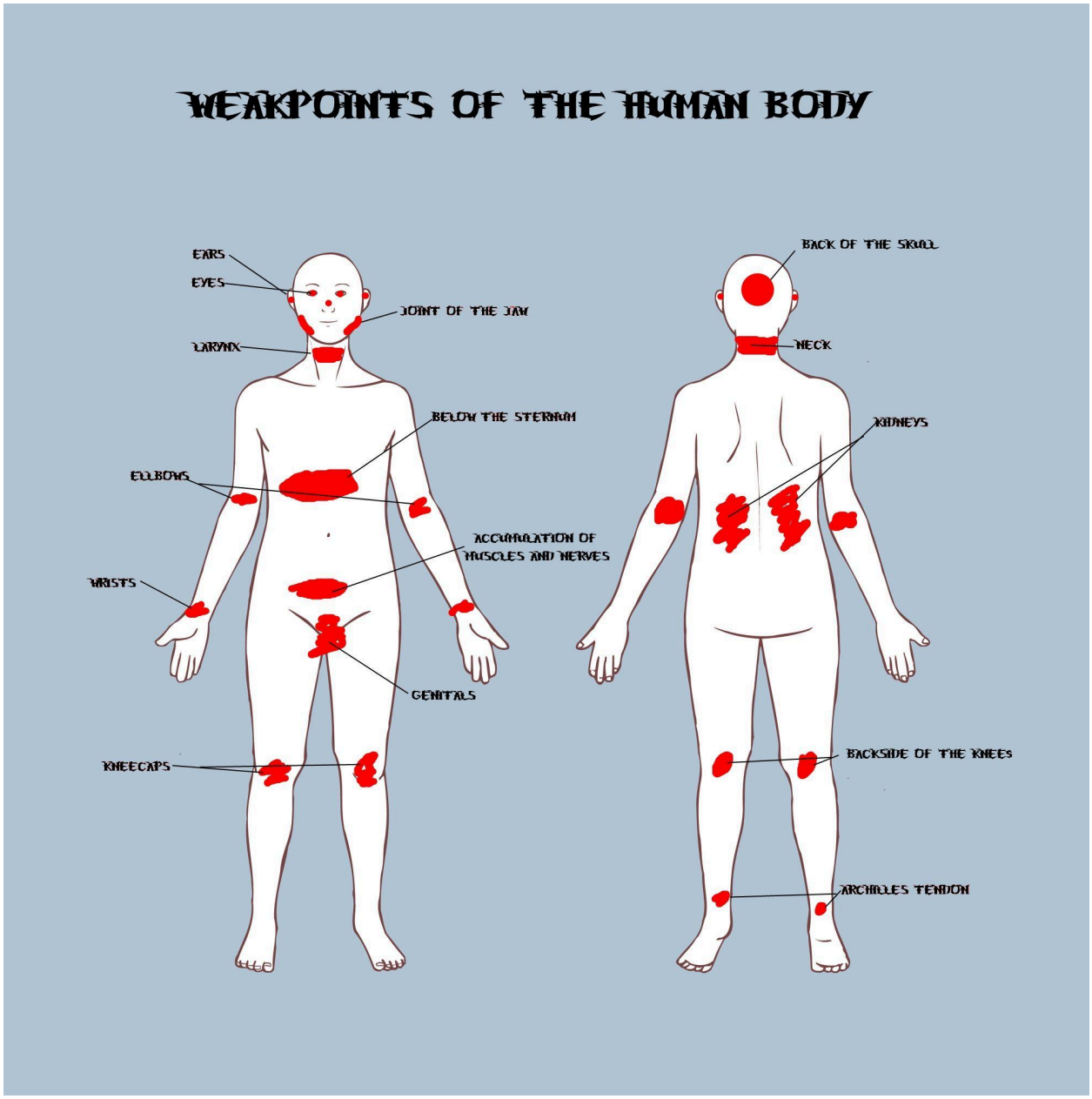
Lastly the tourniquet came about from wars like the iraq war. The reason is that in modern war it is very common to get small wounds in the extremities, from shrapnel or bullets, to legs or arms, and one does bleed out unless you stop the blood flow. Which is easily done with a tourniquet, so much death can be avoided by simply applying a tourniquet.
One can also improvise a tourniquet with rope, wire, strong cloth, and a stick or metal rod:
Start by tying the rope around the upper part of the limb as tightly as possible / "half knot"
Then place the stick on the "half knot".
Then tie two "half knots" in a row, on top of the stick.
Then twist the stick very hard and have the wounded person hold it
Write down on a paper when the tourniquet was applied.

Notice: a tourniquet should not be kept on for more than 6 hours, after 6 hours the limb dies and needs to be amputated.
So you apply a tourniquet and write down the time. And the goal is to evacuate them so that a doctor or professional can safely remove it within 6 hours. Ideally as fast as possible.

[3] "Making homemade body armor" Joemycheck1 https://www.youtube.com/shorts/7ZqYqK8awCI

Blade and Bludgeon Based Weapons (Melee and Throwable) and Improvised Variants

The Anatomy of Weak Points on The Human Body



These are the weak points of the human body and they are differently sensitive to different weapons.

If you are fighting unarmed most points apply. Though hits in the back of the head are more suitable with a bludgeon based weapon that can generate the proper force.
And the points on extremities, meaning arms and legs, are sensitive to break if they are held in place. For example, hitting an elbow against an opponent standing regularly won't do much, but if his arm is on a step, then stomping on it will do great damage.
But the primary goal when fighting unarmed is the chin, a normal strike on the chin is enough to stun the opponent.

When fighting with a blade, again the back of the head isn't the primary target. The primary targets for slashing or piercing with a blade are; neck, armpits, elbows, solar plexus (below the ribs), stomach, kidney area, backside of the knees, and achilles tendon.
These places will cause great bleeding.

With bludgeon based weapons you can generate great force and thus most areas are weak to such strikes. But primary targets are the head (especially back of the head, chin, jaw, temple), neck, solar plexus, kidneys, knee caps.

Weaponry

Blade based weapons:

Knives - These come in many variants. I also suggest learning to throw knives, of which there are many tutorials on the internet, and there are specialized knives and blade weapons for throwing.
Another variant are the ceramic knives, these are generally weaker but the idea is that these can pass through a metal detector.

Axes - Larger axes are better for close combat, but smaller have the benefit of being easier to throw.

Shivs - These are extremely easy to make improvised stabbing weapons. It is good to know how to make these if one has limited resources. Very fitting and common for prisons.
The famous version is sharpening a toothbrush, which can be done with a razor.
One can also use a piece of fence or jail fence, one straightens it out at the top and keeps it bent at the bottom and wraps something around the bottom to create a handle.

Generally the idea is to have a sharp top, and then a round bottom. And on the bottom you can wrap cloth, towel, rubber, anything soft that creates a handle.
There's also alternatives involving using wood which can mount razor blades and glass.

Spears

Bow and arrow

Swords and Machetes

Bludgeon based weapons:

Brass knuckles

Tire Irons

Hammers

Firearms

This chapter explains the basics of firearms and then some deeper information regarding improvised firearms. I do not wish to particularly dwell on formal firearm information as much of it is easily available and much better explained almost everywhere on the internet. So I suggest using formal guns and learning this on your own is simple.
But this chapter is more for those who have restricted access to guns.

The first thing to handling weapons are the basic rules of safety:
1 Don't ever point the gun at something you don't intend to destroy.
2 Always know the state of the gun, whether it's loaded or not, if the safety is on or not.
3 Always keep the gun on safety until ready to fire.
4 Make sure there is nothing you do not want to destroy around, in front or behind the target.

Maintenance:
To maintain the function of a firearm you need to learn how to take it apart into pieces and rebuild it.
Then one needs cloth, gun oil, brush, cotton/cleaning patches. One can get all this in gun cleaning sets.

The general steps to maintain any weapons are:

1 You apply oil on all parts of the gun.
For the bolt body you add a little on the outside, and on the top and tap the firing pin so a little oil goes through the bolt body.
For the barrel you add oil to the brush and drag it through the barrel.

Then you let it set in for some hours or day.

Then you clean the parts with the cloth.
For the bolt body you clean the outside with the cloth, and then tap the firing pin again many times and let the dirty oil slip out.
For the barrel you use the cotton/cleaning patches and pass them through the barrel.

I also recommend using an air blow gun to remove sand or dirt from hard to reach places in the gun.

Marksmanship:

Align both sites of the weapon such that they both aim at the target, then you "halve" the target such that the top of the sight aims for the center of the target.
Breathe slowly and hold your breath once you have breathed out some air. Then fire.
It is important when you fire (at least a rifle) that the stock is pressed firmly against your shoulder to stop the recoil from messing up the shot.
When shooting the first time, to set the sights, it is highly recommended to shoot laying down to have maximum stability.

Then it's just to shoot five times, watch the results and then correct the sights, until most shots go in the center.
Increase the distance only once the shots hit the center, if you want to increase the precision.

Reloading:

Reloading ammunition involves building a bullet. The basic idea is to use machines which can bend and fill the bullets in standardized ways, and then one counts and weights the amount of gunpowder for the bullets.
This is a great skill to have, because the same knowledge used to reload bullets can be used to make bullets.
I recommend that any paramilitary organization recycle its bullets after a day of target practice, and have the capacity to produce its own bullets.

So if interested in creating a gun arsenal, I highly recommend first learning to reload bullets, and then expanding into producing bullets.

There are countless videos on youtube that demonstrate this technique and what machines and tools are needed.
The only problem could be to find gunpowder or ammo depending on where you live. But one can create gunpowder from scratch if they so desired.

The FGC MK II Guide provides on page 36 a list of material and other useful information for how to reload/produce your own ammunition.
You can find this guide on appendix 2. And the Ammunition chapter, in my work, on page 544.

Homemade firearms and parts

All guns made from scrap metal or 3D-printers naturally don’t have serial numbers and can have been produced by a large number of people (anyone really with access to scrap metal or a 3D printer).
I recommend though that you wear plastic gloves when making these so that you leave no DNA or fingerprints.

Or at least clean the weapon parts before assembly. Two washes, an alcohol for fingerprints, dry and then bleach for DNA.

Homemade Stun Gun

This is not a regular firearm and is simply included here as an exception because of the name.
These are in fact quite easy to make and there are many guides.
The basic idea is that you use a "volt booster" which can reach hundreds of thousands of volt, from which you get the power to shock.
Then it is a matter of creating the system. Connect the booster to a battery and metal rods with wires, soldering can be required. And then place it in a plastic handle.

Here's a full guide:[4]

Items You'll Need To Build Your Stun Gun

PVC Pipe – 1 inch by 8 inches in diameter will work great for this project. You can really modify with any sort of housing that works for you like a flashlight casing or other things. It might be easier to go to a local Home Depot rather than purchasing on Amazon – you'll save more money by getting the exact piece that you need.
Volt Booster – This will boost the volts up to 400,000 volts so you can really deliver a shock!
18650 Battery – The 18650 just means the size and shape of the battery. These ones will be cost-effective and get the job done.
Push-Button switch – This one will work perfectly at a great price and will make it easier to attach wires to.
Electrical Wire – You can buy new wire or pull it from out of old electronics
PVC Caps – These ones will work for the 1 inch PVC pipe you will be working with.
Soldering iron – You don't need to spend a ton of money here as we're just doing simple soldering. This one will work perfectly for the light soldering we will be doing.
Solder – There is plumbing solder that WON'T work so this one saves you the work of trying to identify what one you need.
Drill – Any drill will work for this. If you don't own one I would ask to borrow your neighbors before buying one!
Screws – Any size will work.
Screwdriver – Phillips head would work best.

There are many, many ways to make a stun gun out of almost anything you can find around your house. The PVC pipe is going to provide you with the most durable housing and the tools required to make a stun gun are simply needed to get the job done so this list will be the most cost-effective for you and the easiest way to get the end result achieved.

[4] "How to make a stun gun with a capacitor" https://taserguide.com/how-to-make-a-stun-gun-with-a-capacitor/

Also, we are going to be using a battery and a volt booster in this tutorial as opposed to the capacitor. You can certainly use a capacitor if you wish, but if you are not familiar with soldering a blank circuit board and also with which capacitor to use you will greatly increase the risk of electrocuting yourself as well as ending up with a device that simply doesn't work. The point of this tutorial is to ensure you have a fully functioning taser by the end of this article!

Step-by-Step Instructions

Step 1.) Solder the wires to the 18650 battery
First, you will want to solder the red wire to the positive side of the battery. Respectively you will solder the black wire to the negative side of the battery. Make sure to solder it on the sides so you can put the battery back into the power bank and charge it to re-use your stun gun!

Step 2.) Attach wires to the Push-Button switch
The PVC pipe is pretty long so we are going to need to make the wires of the Push-Button switch. Go ahead and take 2 pieces of wire, about 4 inches each, and attach it to the wires of the Push-Button switch. Afterward, wrap the connections with electrical tape.

Step 3.) Setup the PVC pipe and caps!
Start by marking a dot about 3.45 inches up the length of the pipe. Next, take one of your PVC caps and make 2 dots on the inside of the cap side by side but with space in between them.
Then with the hole that is 3.45 inches up the length of the pipe needs to be drilled and you want it to be about the size of the push-button switch. Don't worry, we aren't trying to be perfect with this.
Then drill a hole through each of the 2 dots on the PVC cap as well.

Step 4.) Insert the Push-Button switch
Place the push-button switch inside the hole. Make sure the wires you attached are sticking down and out of the short side of the pipe, so you can access them easily. If the hole is too large you can wrap the push-button switch with electrical tape to fit it more snugly in the hole.

Step 5.) Screw the Cap
First, attach 1 wire about 2 inches long to 1 screw and then do the same thing with another wire to the 2nd screw. You will then take your screwdriver and screw them into the cap. Lastly, put electrical tape on the heads of the screws to secure it. Your pointy part of the screws should be sticking out of the top of the PVC cap.

Step 6.) Connect your volt booster
Next, you want to connect the wires leading from the volt booster to the wires that are leading towards the screws. Then again apply the electrical tape to the connection point of the wires.

Step 7.) Fit everything in
Now you will want to fit the volt booster in. You will put it in on the longest side so that the wires of the volt booster and the starter are both sticking out of the short side. Also, you can slide a piece of foam in with the volt booster to prevent it from bouncing around in there.

Step 8.) Connect Volt booster and battery to Switch
Connect the negative wire of the volt booster to the wire of the push-button switch and be sure to secure it with electrical tape. Then connect the negative wire of the battery to the 2nd wire of the push-button switch. Again, apply electrical tape to the connection.

Step 9.) Cap it!
Slide the battery all the way in and put the cap on your stun gun is set to go! As time goes on you will use all the charge in your battery in which case you can simply remove the cap and recharge the battery.

Pen guns

A pen gun is a firearm that resembles a pen or is improvised from pen materials. Naturally these often fire smaller calibers, ex: 22 LR, 0.25ACP, 32 ACP, 38-caliber, etc.

The idea is very simple. Basically there's a cylindrical body and barrel for the bullet, and inside you have a mount for the bullet, and you also have a firing pin with a body that slams with a spring. And some create holes in the cylindrical body so that they can lock it cocked.
So basically it is a firing pin triggered by a spring in a cylindric body, and that ideally can be masked as a pen.
These are a variant of the zip gun, and liberator in a sense. One can sneak close to a target with a good weapon and ammo, and execute them with the pen gun or other weaponry if necessary.

Here's a guide:[5]

[5] "The ZIP Gun" https://thehomegunsmith.com/pdf/ZipGun.pdf

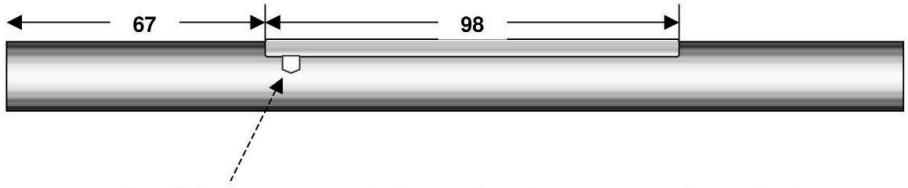
THE 'ZIP' GUN

(Measurements in millimetres unless otherwise stated)

The Zip, or Pen Gun, as it is sometimes referred to, is perhaps the simplest of all improvised firearms and is usually found in .22 calibre due to the relatively low pressures generated by this small cartridge.
I decided that a need existed for a simple homemade version of this tried and tested ''contraption'' and came up with the following design !
I designed this weapon with the caveat that it should be buildable in one day or less, and I think I have achieved that requirement.

The Receiver.

The receiver is basically a steel tube into which the other component parts are fitted. It consists of a 9 ¼ " (233mm) length of 15.88mm (5/8") x 1.5mm steel tubing, as illustrated below. Into this tube a slot is cut, either by drilling a series of interconnecting holes first, and then trimming the slot to shape with a file, or (for the lucky individual) cut using a milling machine, if available! The slot should be ¼" in width and will accept the breech block handle in due course. The slot is 98mm in length, starting 67mm from any end of the tube.



Small Cut out in rear of slot to allow the weapon to be cocked.

Component Parts

(There are only three component parts to the weapon)

1. Barrel
2. Breech Block
3. Breech Plug
4. Mainspring

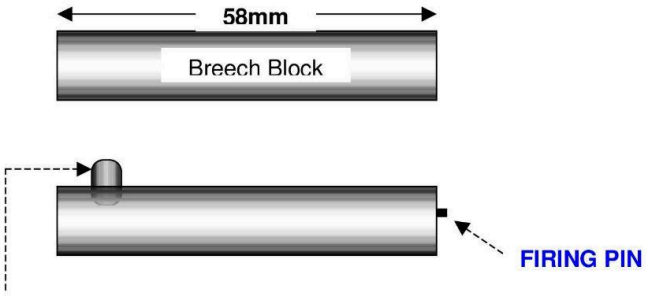
Prototype Design Drawings

Barrel Construction.

The Barrel can be nothing more than a short length of steel Airgun barrel, turned to a diameter of 12.70mm (½"). The length of the barrel is 75mm. One end of the barrel is chambered using a 5.8mm diameter drill bit to accept the .22 rimfire cartridge.

Breech Block

The breech block is just a 58mm long section of ½" diameter mild steel bar. Into one end of the block a firing pin is fitted, made from a short length of 2mm diameter drill shank. The pin must be carefully fitted so as to be in the correct position to detonate the .22 rimfire cartridge.



Near to one end of the breech block a ¼" Dia' hole is drilled to accept the breech block cocking handle. The handle consists of a simple steel pin about 1" in length.

Mainspring

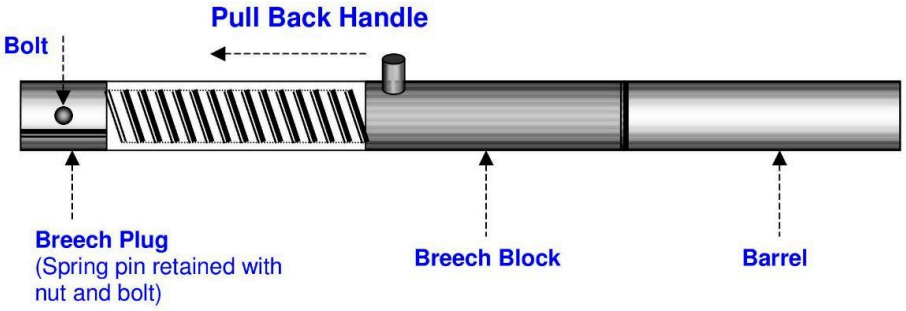
The mainspring powers the breech block and should be reasonably strong. I designed this gun to use a spring about 8- 9mm in diameter and made from 20 gauge wire.

The Breach Plug

The breech plug is responsible for holding the spring and breech block in place. It consists of nothing more than a 1" x ½" spring pin.
The pin is held in place by a 6mm diameter steel bolt and nut which passes through the receiver from side to side, as illustrated below.

Fully Assembled

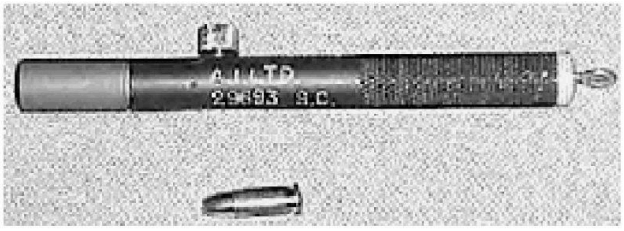
Pull back cocking handle and turn to right to cock weapon.
Load cartridge. When ready to fire disengage handle using thumb or finger…… *Bang!*



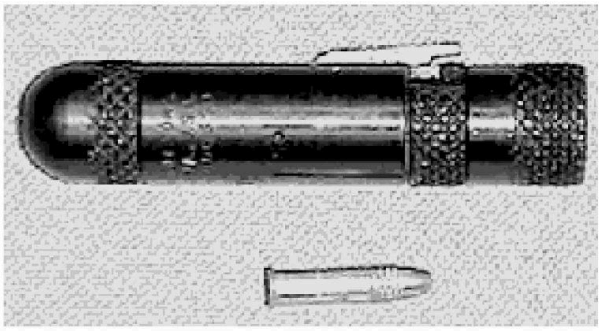
This design may be very simple, but I think it would be easy and quick to build !

Prototype Design Drawings

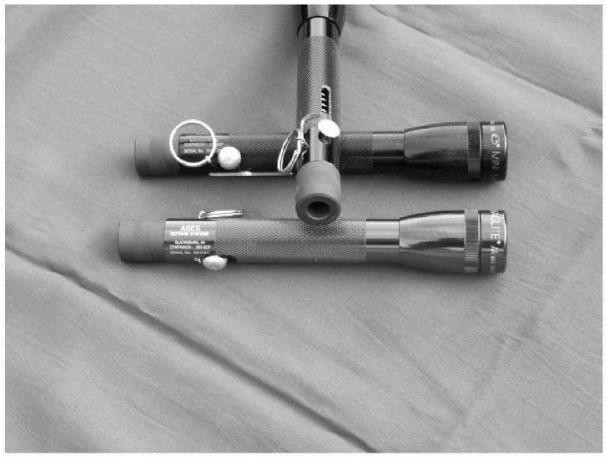
A few examples of Zip / Pen guns built by other private individuals and arms manufacturers.



Armitage Pen Gun. www.lawdogs.8m.com/ catalog.html

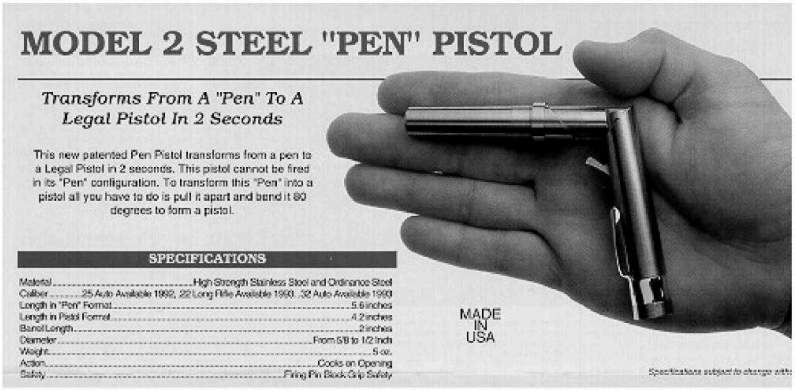


''Stinger'' Pen Gun. www.gurpsmaster.de/ undercover.htm

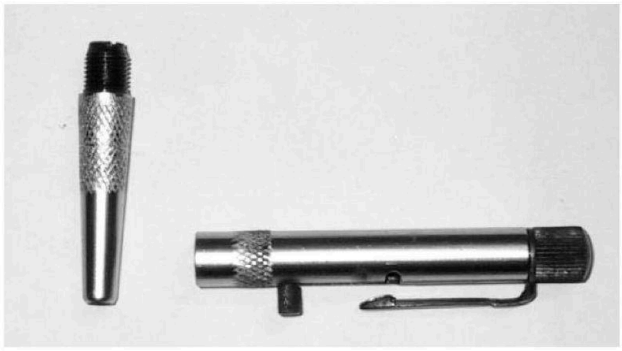


''Mini Mag Light'' .22 Torch Guns. www.lawdogs.8m.com/ catalog.html

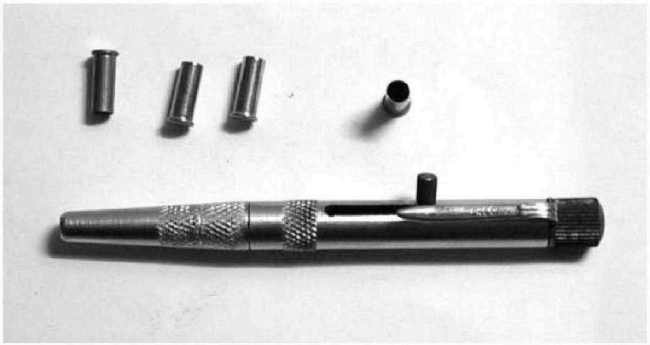
Prototype Design Drawings


MODEL 2 STEEL "PEN" PISTOL
Transforms From A "Pen" To A Legal Pistol In 2 Seconds
This new patented Pen Pistol transforms from a pen to a Legal Pistol in 2 seconds. This pistol cannot be fired in its "Pen" configuration. To transform this "Pen" into a pistol all you have to do is pull it apart and bend it 90 degrees to form a pistol.
SPECIFICATIONS
Material.....High Strength Stainless Steel and Ordinance Steel
Caliber.....25 Auto Available 1992, 22 Long Rifle Available 1993...32 Auto Available 1993
Length in "Pen" Format.....5.6 inches
Length in Pistol Format.....4.2 inches
Barrel Length.....2 inches
Diameter.....From 5/8 to 1/2 Inch
Weight.....5 oz.
Action.....Cocks on Opening
Safety.....Firing Pin Block Grip Safety
MADE IN USA

American factory made ‘’Pen’’ pistol. www.gurpsmaster.de/ undercover.htm



Unknown origin. Very nice homemade Pen Gun.
http://membres.lycos.fr/abpw/22-misc/pages/Pen_Gun1_by_Nobody.htm



Prototype Design Drawings

A .44 calibre Pen Gun. This is an old collectors piece made by the 'Lake Erie Chemical Co'. www.adrax.com/ watsons/pengun.htm

Prototype Design Drawings

Liberator

Liberators are extremely simple and cheap to produce firearms, and they are easily made improvisable. These are “zip guns” with handles, and sometimes more advanced functions like safety, magazines, sights, etc. So these are generally more complicated but better than pen guns.

In world war two these guns (the FP-45) were mass produced and dropped behind enemy lines with the idea that partisans could arm themselves and try to kill the occupying forces, ideally taking the better arms of enemy forces.
So the general strategy of these hasn’t been to match the fire power of formal forces, rather to sneak and surprise the enemy delivering one or few bullets to neutralize a more heavily armed enemy, and then taking the better weapon. For a paramilitary this could be something like killing a soldier, border patrolman, civilian or police man, and taking their formal weapons.
Notice though that police often move in pairs so one gun with one bullet will not be enough. And if one does surprise and neutralize a police patrol then remember to check their car for weaponry, not just the utility belt on the police.

In modern times there have come about many different variants, some that even incorporate 3D printing like the “Liberator” and “FGC-9”.
3D-printable weapons have a great advantage of being much harder to trace. As they have no serial number when produced and any person with a 3D-printer could have produced them.
I also recommend researching on your own as there are countless 3D-designs of guns, and some are demanded to be removed like the liberator.

The biggest problem is finding ammunition. If one lives in a country restricting ownership on firearms, naturally they restrict access to ammunition as well.
Ammunition can be stolen from the army, gunstores, civilians with fire arms, etc. But if you are really inclined one could make their own ammunition, with their own gunpowder. And if that is too hard, one could even make a “musket” type arm, meaning you fill a barrel with gunpowder and then add a metal ball which is propelled.
Notice: The FGC MK II Guide provides on page 36 a list of material and other useful information for how to reload/produce your own ammunition.
You can find this guide on appendix 2. And the Ammunition chapter, in my work, on page 544

Metal Liberator:
The basic principle is to have a barrel which can hold the bullet, then a hammer/firing pin which is propelled by a spring, and a lock system for the hammer/firing pin which is released by a trigger.
Basically a hammer with a pin that strikes the bullet hard enough with the help of a spring, and a barrel to help propel the bullet.
Very similar to the pen gun but with a grip.

3D-printed Liberator:
The printing takes about 20 hours and when assembled works like a fully functioning gun, made entirely from plastic. Which makes it untraceable and undetectable. But it usually only has a life span of 7-10 bullets.
I highly recommend seeing if it is possible to incorporate metal into the design to make it more reliable. Like a nail for the firing pin or metal springs instead of plastic ones.

The designs are available on Github:
https://github.com/jdneidig/Liberator

And an instructional video on the mechanics:
https://www.youtube.com/watch?v=DoPVe7MiY1w

FGC-9 MK II:
This is the most advanced variant, and shouldn't really be considered a liberator. This is a semi-automatic pistol caliber carbine.
I only include it here for the same principle of usage, meaning that it is good to kill a stronger enemy and take their weapon. Though it being semi-automatic, having a magazine with many rounds and being much more durable than other 3D designs because it does incorporate metal, makes it a lot more realistic to match the firepower of formal forces.

The full guide is available on archive.org:
https://archive.org/details/fgc-9-mk-ii-guide/mode/2up
https://ia903402.us.archive.org/16/items/fgc-9-mk-ii-guide/FGC-9_MkII_Guide.pdf

I will also include the entire guide page by page at appendix 2.

Borz

Borz is chechen and means "wolf", it has become slang for improvised submachine guns.

In the extensive series "Practical Scrap Metal Small Arms" we find a guide on volume 9:
https://archive.org/details/professor-parabellum-collection_202311/Professor%20Parabellum%20-%20Practical%20Scrap%20Metal%20Small%20Arms%20Volume%209%20-%20Build-A-Borz/

I won't list every single volume because of a few reasons; one can simply access all by the same link, these volumes are not long either, and lastly I try to give a basic wide ground.
I'm not trying to show every variant of improvised firearm, but rather give good examples of different types. For example simple pen guns or other manual Zip-guns, more complicated semi automatic guns, and Borz an automatic gun.
If one wants to see more variants than the same link can be used to see what is available.

1911 Handgun

Semi automatic pistol. Which can be improvised from scrap material. It normally chambers 0.45 ACP, but notice that if you make it from scratch you have to be thorough to make the ammo fits.

Caleb Lee has a guide:
https://d3l1h3n4or6wo9.cloudfront.net/UGAR/product/1911/The-Underground-1911-Guide.pdf

AK 47

Needs no introduction really. But generally it is automatic (has selective fire) and chambers 7.62 x 39mm.

Caleb Lee's Guide:
https://d3l1h3n4or6wo9.cloudfront.net/UGAR/product/undergroundak47buildmanual.pdf

AR-308

An AR variant that chambers 0.308 instead of the standard 5.56 NATO caliber. Meaning it chambers a larger bullet, in Caleb Lee's guide he describes the rifle as being bigger than standard also.
The AR-308 is semi automatic.

Caleb Lee's Guide:
https://secure1.ghostgundvd.com/UndergroundAR308MainManual.pdf

Ammonution

The FGC MK II Guide provides on page 36 a list of material and other useful information for how to reload/produce your own ammunition.
You can find this guide on appendix 2. And the Ammunition chapter, in my work, on page 544

One can also make their own gunpowder, which I cover in explosives on page 544.
Furthur if you can't find bullets one can even melt cast bullets if they really wanted.
The internet and youtube provides more than everything you need to know about reloading ammunition which is the same science as producing ammunition.

Lastly, I'll mention "bullet modifications". These are attempts to imitate bullet variants.

For example there are bullet variants like; full metal jacket (FMJ), hollow point (HP), split point (SP).
Generally a FMJ is the normal shaped and full bullet. This bullet is the best for penetrating.
While HP and SP have deliberate holes in the middle to create a bigger penetration hole, this means less penetration but more “damage” (wider wound).

One can improvise these modifications usually by converting a FMJ to a HP.
Classic method is to put a knife on the tip of a FMJ standing up right, and gently taping the knife with a tool to chop into it. Chopping one line makes a SP, chopping two perpendicular lines (cross) makes it more like a HP.
Another method which is safer and a little more complex is removing the bullet from the case, and then chopping, before putting it back.
Or one can remove the bullet and drill a small hole into the tip, before putting it back, which makes it more like a real HP.

Suppressors

There are a few ways to make homemade suppressors

The first and simplest method is simply filling a plastic bottle with sound reducing material and taping it on the barrel, top to top. Though these obviously don’t have long life span, they do actually provide some suppression. But they can also affect the bullet trajectory making the aim less reliable, especially the denser the material is, which is unfortunate because the denser material would silence more.[6]
I suggest doing this only if there is no other alternative and you are going to shoot at close range like in a building, this would help silence your shot.

The second method uses oil filter cans. These suppress effectively, are durable and easily mountable. It takes a few seconds to mount it. One only needs an oil filter can and an adapter, to connect the can and rifle barrel.
Look for threaded adapters. Typically M22x1.5 for oil filter cans, 1/2x28 or 5/8x24 for standard firearm barrels. But verify otherwise on your own by simply measuring.[7]

Lastly another famous method uses solvent traps. These can be converted into silencers, by simply drilling a hole on the other side of the threads.
And one advantage for these are that they list all important measurements of threads.[8]
Normally they are intended for oil filters (meaning M22x1.5). But there are some that are 1/2x28 or 5/8x24.
So you buy one with the right thread, assemble, drill a hole on the other side than the thread, and then screw it on.

[6] “Hollywood V Reality: Steel Wool, Cotton Balls, and Expanding Foam. Don’t try this at home” https://www.youtube.com/shorts/APmaiXoWvfg
[7] “Do Oil Filter Silencers even work?” https://www.youtube.com/watch?v=b82a0wMGSTk
[8] “Solvent Trap Suppressors Dangerous?” https://www.youtube.com/watch?v=SxElM8XiU8c

Flammables

Basics of Fire

There are three key elements to having a fire. Heat, fuel and oxygen. This is often referred to as the triangle of fire. And one should be aware of these elements to help accelerate or quench fires.
Many criminals have made the mistake of thinking it is simply a matter of fuel, keep adding accelerants to make the fire stronger, and often make a fire with too little available oxygen. The result becomes that the fire doesn't grow as much as it could potentially because of the lack of oxygen to sustain it.
So to set a fire the key is to make sure there is sufficient fuel, heat and oxygen.
For example; if you want to burn a house down, you can open the windows to help increase airflow.
Or if you want to burn a store down, then start the fire near openings like the doors or windows, these are sometimes left open especially during summer.

Then there's certain terminology regarding fire which is good to know. Because it helps understand when researching material how they can be used to start fires.

Smoke point:
The smoke point (also called the burning point) is the temperature at which an oil or fat begins to produce continuous visible smoke.

Flash point:
The flash point is the "lowest temperature at which a liquid gives off vapours in a quantity such that it is ignitable with the air".
Basically a temperature after the melting point at which the liquid can be set on fire, though it isn't necessarily at this point the fire will sustain itself.

Flammables are generally materials that have a flash point less than 37.8°C.
Note that I will use flammables more broadly to include materials that are good to use for fires. But when researching on your own remember that more formally speaking a flammable are those that set on fire around 37.8°C.

Materials with a flash point above 37.8°C are called "combustible".

Again at this point with an external heat source you can create a temporary fire.

Fire point:
The fire point is the temperature at which the fire will sustain itself. For some material the fire point may be reached at the flash point or slightly after.

Generally most materials only have their flash point listed, because if you reach that point you generally reach the fire point as well. It is rare that you would control the temperature so specifically you reach the flash point and not the fire point.

At this point with an external heat source you can create a sustainable fire. (and it is often close or the same as the flash point).

Autoignition temperature:
This is the temperature at which the material will ignite on its own. Meaning it requires no external heat source. It will start a fire at this temperature on its own.

Flashover:
A flashover occurs when the temperature rises so much that the autoignition temperature is achieved for most or all materials in an enclosed space. The effect is that the entire enclosed space begins to combust or is set on fire.
Flashover normally occurs at 500°C or 590°C.
This is one of the most feared phenomena of firefighters and the goal of the arsonist.

Basics of Arson

The common items to set fires are matches, lighters and fire steel. And less common batteries.
Batteries can be utilized because when you connect the cathode and anode with a metal wire the electricity being passed through generates heat. Light bulbs are an example of how to rig such wire. You want the wire to be a spiral closely circled around itself. That preserves the heat in the wire helping it to heat itself up. And the metal wire or “filament” is made of tungsten, which has a high melting point and good electrical resistance. Electrical resistance is good because it means it will heat faster and to higher temperatures by the electricity, and the high melting point means it can handle that temperature without destroying the circuit.
So if you want to start a fire you can use common materials like matches, lighters, fire steel or do some trick involving batteries.

To use a regular battery you either make your own wire, or use a light bulb wire which is easy to remove.

Lithium-ion batteries are known to be dispositioned to cause fires. When connecting the anode and cathode in such a battery it will heat itself up until it starts a fire. This can be done by stabbing such a battery and destroying the barrier that exists between the cathode and anode.

Basically short circuit a battery by connecting the + and -, anode or cathode, and ideally with wide closely woven metal.

Time Delay Devices

Naturally arsons want time before the real fire begins so that they can escape unnoticed. To do this they rigged the fires so that it begins with a small fire which lasts a while before spreading and taking on.
For these devices I don't recommend batteries and light bulb tricks because these wires heat up almost instantaneously.
Traditionally arsonists have used cigarettes and matches to make time delayed devices.
The famous arsonist John Orr used this type of device for his seven year arson spree. His method involved binding together a cigarette to three matches, so that the top of the matches are on the bottom of the cigarette (and above the filter). When the cigarette was ignited it would burn for around 5 min before the matches ignited and then spread the fire.

Another way some arsonists created even longer time delay devices was by using mosquito coils. These are coils that usually burn for 1 hour and are meant to kill mosquitos.
Naturally these are great because you can time your arson depending on how much coil you use. Ex half of a 1 hour coil for 30 min delay or a third of a 1 hour coil for 20 min, etc.
Remember to add matches with rubber bands at the end with the tips on the burnable material.

The general idea is simply that you have a slow burning item, and a fast/strong burning item, and you connect the two.

Slow burning items:
Cigarette - 5 minutes
Incense stick - 20 - 90 min (usually placed into cigarettes or matches)
Mosquito coil - usually 1 hour
Candle - ca 5 hours

Fast burning items:
Matches
Matchbook
Sterno
Firework powders
Accelerants

Lastly when using time delay devices it becomes possible to time different fires. And arsonists have done this to create distraction fires. They rig the devices such that a fire begins at one location far away, drawing fire fighting resources there, and then another fire begins at the real target location.

Molotov Cocktail

The improvised throwable incendiary device.
All that is required is a glass flask, rag, liquid accelerant and lighter.

The device is prepared by first dousing the rag in the accelerant, and stuffing it halfway into the glass bottle filled with accelerant.
Then the rag is lit and the device thrown.
It causes two dangerous, first glass shrapnel, but more dangerously lit accelerant liquid splashing.

30-40% Liquor can also work, but higher concentration ethanol works better.
Lower concentration alcohol has too much water and cannot work properly.

I personally recommend trying different accelerants, liquor, distilled high concentration ethanol, hand sanitizer, gasoline/fuel, homemade napalm, acetone, etc (really any flammable liquid).

Accelerants

It is important to be aware of what type of accelerants exist, because it helps understand how to best incorporate them into a fire.
For example; burning a food store, start a fire near potato chips, these are covered in fatty oils and the packaging is plastic so they burn easily. This is how the arsonist John Orr was able to efficiently burn down stores.
Basically the goal is for the fire to grow as quickly as possible and you want as many accelerating items close by as possible. And ideally make sure there is good airflow.

It is recommended to practise using the accelerants you want to incorporate. Basically practice to see how to set fire to potato chips if you aim to burn down a store. Or maybe practise on cooking oil, one can always open such a bottle and pour it on the place you intend to burn.

CAUTION

Making fire starters and napalm is surprisingly easy. These are very straightforward but can have potentially dangerous fumes, so it is recommended to do it outside, or the balcony or garage. Avoid excessive fumes and use good ventilation.

Wax

Paraffin wax (What candles are made of, can be used to stabilise explosives)
Car wax
Floor wax
Beeswax

Alcohols

Ethanol (spirits work, but hand sanitizer is better)
Methanol
Acetone (often sold in nail polish or nail polish removers)
Isopropyl Alcohol
etc

Car Fluids

Starting fluid (diethyl ether, octane, etc)
Antifreeze (ethylene glycol or propylene glycol)
Fuel (gasoline and benzene)
Brake fluid (glycol-ether, silicone)
Non-chlorinated brake cleaners (benzene, toluene, xylene, ethanol, methanol, isapropanol, acetone, etc

Aerosol Cans

WD-40
Body sprays
Pesticides
Spray paint
White lithium grease (also available in tube form, though harder to ignite).

Household Items

Any oils really, and organic material, meaning cloths/clothes, good to know when targeting food stores or clothes shops.

Oil-based paint
Cooking oil
Flour (especially in dust form and suspended in the air)
Handsanitizer (ethanol)
Nail polish and nail polish removers (acetone)
Laundry products
Black shoe polish
Turpentine (obtained by distillation of resin harvested from living trees)

Napalm

Common name now for sticky incendiary gel, it is often a combination of flammable liquid and thickener agent. But prior napalm used to refer only to the thickener agent which makes flammable liquids like gasoline jellied.

Styrofoam/polystyrene and alcohol combination.
To make homemade napalm you can add styrofoam to gasoline or acetone. Keep doing this until the liquid becomes jellified.

Cotton and vaseline.
Simply mix cotton and vaseline, this makes a slow burning jelly which is suitable as a fire starter and napalm.

Acetate salts and alcohol.
This is a variant called “california snowballs”. An example is mixing calcium acetate and ethanol.
If you want you can make calcium acetate, simply combine calcium supplement or eggshells with acetic acid.

Flash Powders (metal fuel and oxidizer)

Read oxygen balance in explosives, so you can balance and have maximum efficiency for the explosive
Otherwise, you can look up someone's balance/composition, or experiment yourself by trial and error.

Almost any kind of metal fuel and oxidizer works together, if you balance it correctly. Though some nuances are important as some combinations are known to work and some combust on their own.
So if unsure, try on a small scale. Or really just try always on a small scale to understand the probable effect.

Potassium permanganate and glycerol combusts on its own.

To mix flammable or explosive powders, use the bag shake method or paper folding method:
Bag shake method: put the material in a plastic bag and shake it.
Paper folding method: put the material on a paper, spread it out, and fold corners back and forth until the material is mixed. You basically lift the edges of the paper to fold the material on itself, this is the safest option.

Metal fuels:
Aluminium powder
Magnesium
Zinc

Non-metal fuel:
Sulfur

Oxidizers:
Nitrites
Nitrates
Chlorates
Perchlorates
Sulfates
Manganates
Permanganates

Thermites and Thermates

Read oxygen balance in explosives, so you can balance and have maximum efficiency for the explosive
Otherwise, you can look up someone's balance/composition, or experiment yourself by trial and error.

A thermite is a metal fuel and metal oxidizer.

To mix flammable or explosive powders, use the bag shake method or paper folding method:
Bag shake method: put the material in a plastic bag and shake it.
Paper folding method: put the material on a paper, spread it out, and fold corners back and forth until the material is mixed. You basically lift the edges of the paper to fold the material on itself, this is the safest option.

Dugan's Says:[9]

To begin the simple way to initiate thermites and thermates is using simple fuses. This also gives possible time delay to your incendiary devices. And if a little creative one can create thermite hand grenades, or incendiary grenades.

Titanium dihydride (THPP):
TiH2 (Titanium dihydride) 32.43% (by weight)
KCIO4 (Potassium Chlorate) 67.57%

[9] "Thermites & Thermates" Dugan Ashley, 24 Jun 2025 https://www.youtube.com/watch?v=pnrA02ohqBg

Powerful and can reach temperatures upwards around 4000 K, ca 3627°C. Note this particular composition when confined and pressurized the detonation velocity increases and can suddenly work more like an explosive than accelerant.

Another variant is that you replace potassium chlorate with potassium nitrate. Use 66% potassium nitrate for the mixture.

In “thermitic thermodynamics” (source 6 in mostly used sources) there are lots of tables and lists describing different materials and what mixtures achieve the greatest destructive power. But the big problem is that a lot of it is not publicly viable.
So if you raid a chemical lab then I recommend looking at formal literature to create the best composition. Otherwise you have to compromise and work with what is available.

Generally speaking there are two prominently available metal fuels for the leyman creating thermite. It is silicone and aluminium. Silicone is not recommended at all, these mixtures are often much weaker than aluminium. For fire purposes silicone might be enough, but if you want to maximize destructive power then you go for aluminium powder.
So when making termites you use aluminium powder.

Oxidizers that synergize well with aluminium powder, that are high performance and low cost, are:
Fe_3O_4 (Black Iron Oxide)
Fe_2O_3 (Red Iron Oxide)
MnO_2 (Manganese Dioxide)
Notice that aluminium powder can be bought, but also made at home by breaking aluminium foil into powdered bits.

With above mentioned information you can with low cost acquire the materials, and simply need to mix, pack it in a container, and practise a reliable method of triggering the thermite.

Composition 1:
Al (powder) 23.7% (by weight)
Fe_3O_4 76.3%
This achieves the highest peak temperature around 3124.47 K. It also creates the most amount of liquid metal byproduct.

If you however want to maximize the gas output you increase the fuel percentage to 28.4%. Meaning aluminium powder is 28.4% by weight of the total weight. And Fe_3O_4 is 71.6%

Composition 2:
Al (powder) 25.3%
Fe_2O_3 74.7%
This achieves the highest temperature around 3126.19 K. And also maximum liquid metal residue.

For maximum gas output use 31.1% aluminium and 68.9% Fe2O3.

Composition 3:
Al (powder) 17.2%
MnO2 82.8%
This achieves the maximum temperature of 3379.96 K

For maximum metal residue and a maximum temperature that is quite low (2490 K) you use the following admixture.
Al (powder) 29.3%
MnO2 70.7%

For maximum gas output.
Al (powder) 33.8%
MnO2 66.2%

Naturally of course you will normally strive towards reaching the highest temperature possible. I only recommend considering moving the composition in the direction of maximizing gas output if you are trying to reach a target that is high up (some distance above where the thermite will be).
But if the distances are short, then maximize temperature by doing the correct compositions.

These are some very inexpensive and easy to make termites suitable for paramilitary purposes.
Thermite can be pressed into a container and set off with a simple fuse and this creates a thermite grenade. Depending on the fuse you can create different time delays.
And the grenade itself is suitable for destroying most things. Especially cars which are mostly made of burnable material and full of fuel.
So these can be used to destroy vehicles, equipment and structures.

Moving on to thermates. Basically a thermate is a more complicated thermite that was specially designed for incendiary grenades. The idea is that they produce immense gas output that shoots upwards and then secondarily at the sides.
So while thermites keep their temperature where it is, thermates shoot a lot more temperature upwards and to the sides. Thermates are highly recommended to set fire to things above the charge or grenade.
Again if there's greater distance, especially upwards, you want gas output thermites or more ideally a thermate.
If distance is not a problem then prioritize maximum temperature both thermites and thermates at max temp will suffice.

Appendix 3 has the thermate formula used in incendiary grenades.
There are two variants: (% = by weight)
Aluminum, granulated 16% (small granules)

Aluminum, grained	9%	(powder)
Black Iron Oxide	44%	
Barium Nitrate	29%	
Sulfur	2%	

Second formula:

Aluminum, granulated	19%	(small granules)
Aluminum, grained	3%	(powder)
Black Iron Oxide	51%	
Barium Nitrate	22%	
Resin	5%	

(Commercially available resin is used)

Note three things:
1 Barium nitrate is available and can be bought, but if for whatever reason it is hard to come by, you can use potassium nitrate instead.
2 You can also replace black iron oxide with red iron oxide or manganese dioxide.
3 It's a finesse of having differently granulated aluminium. You can also work successfully without this finesse. But it is worth mentioning because it is not that hard to achieve at home, or to buy differently grained aluminium powders on the internet.

Finally here are the compositions for thermate analoges:
(Under the name Dugan gave them) (% = by weight)

MXB:

MnO2	17%
Al	37%
Ba(NO3)2	43%
S	3%

MXK:

MnO2	19%
Al	41%
KNO3	37%
S	3%

F2XK:

Fe2O3	43%
Al	28%
KNO3	27%

S	2%

F2TK:

Fe2O3	51%
Al	19%
KNO3	28%
S	2%

F3MK22:

Fe3O4	53%
Al	23%
KNO3	22%
S	2%

TH3: (standard thermate)

Fe3O4	44%
Al	25%
Ba(NO3)2	29%
S	2%

Lastly manganese dioxide and barium nitrate when pressed into a container can explode rather than burn. Keep that in mind when doing those variants.

Explosives

Basic Theory of Explosives

Combustion or burning is an exothermic redox. Redox simply means that an electron is passed from one atom to another. And this happens between a “fuel” and an “oxidizer”.
The fuel or reducer gives electrons, and undergoes oxidation.
The oxidizer receives elections, and undergoes reduction.

Basically:
Oxidation is losing electrons.
Reduction is gaining electrons.

Oxidizers undergo reduction.
Reducers undergo oxidation.

Explosions are just really fast and powerful exothermic redox reactions. And to have such a reaction you need an oxidizer (receiver of electrons) and reducer (giver of electrons).
Most explosive materials are either oxidizers or fuels, but they are capable of rapidly undergoing redox by reacting with the oxygen in the air.
Meaning some explosives involve one material and the air, or it involves a combination of materials.

To find what materials or combinations are explosive you can research that simply using the internet, like something basic as wikipedia. But to have a more specific measured account for the explosive power of material than you can use the “RE Factor” or “detonation velocity”.

RE Factor:

The RE factor (relative effectiveness factor) or “TNT equivalent” is a measurement to compare the explosive power of materials to that of TNT.
Basically it is a factor which shows how much mass of a material is needed to achieve the same effect as a certain mass of TNT.

Formula: (M = mass of tnt) (m = mass of explosive material) (re = re factor)
M/re = m

Examples:
We are going to use the explosive PETN and want it to have the same effectiveness as 1kg of TNT.
The RE factor of PETN is 1.66.[10] Thus we need:
1/1.66 ≈ 0.6. Meaning we need 0.6 kg of PETN to achieve the power of 1kg of TNT.
Notice the greater the RE factor the greater the power is and thus less explosive is needed.
We are going to use the explosive urea nitrate and want it to have the same effectiveness as 1kg of TNT.
The RE factor of urea nitrate is 0.77.[11] Thus we need:
1/0.77 ≈ 1.3. Meaning we need 1.3 kg of urea nitrate to achieve the power of 1 kg of TNT.
Notice when the re factor is less than 1 then the explosive is weaker than TNT and more is needed.

Here’s websites giving lists on RE factors:
https://en.wikipedia.org/wiki/TNT_equivalent
https://military-history.fandom.com/wiki/Relative_effectiveness_factor

Detonation Velocity:

The second measurement is detonation velocity. Detonation velocity is the speed at which the shock wave of the explosive travels at detonation.
Higher detonation velocity means more power. And usually the detonation velocity is listed with a density or “tested density”, it shows at which density the detonation velocity was achieved. The reason is that higher densities of explosives usually correspond to higher detonation velocity. Achieving higher density and thus greater explosive power usually involves compressing the explosive and containing it in a closed space.
Notice however that pressing explosives should always be done with care and protective measurements, like a ballistic barrier, as explosives can explode when exerting too much force on them.
That said for some explosives the pressing and increase of density can be very important in achieving a good detonation velocity and making it effective.

[10] “Pentaerythritol tetranitrate”, 25 Jun 2025 https://en.wikipedia.org/wiki/Pentaerythritol_tetranitrate
[11] “TNT equivalent” 26 Jul 2025 https://en.wikipedia.org/wiki/TNT_equivalent

Lists of detonation velocities:
https://en.wikipedia.org/wiki/Table_of_explosive_detonation_velocities

Sensitivity and classification:

Explosives have different sensitivities and this is very important to know before making any explosives. It helps understand how explosives should be made and handled, and how much one should make.
There are different types of sensitivities to be aware of:
Shock sensitivity - how hard do you have to strike it with a hammer to detonate it
Friction sensitivity - how much friction is needed to detonate it
Heat sensitivity - how much heat is required to detonate

Explosives having different sensitivities give rise for classifications.
Generally when constructing a bomb; the main charge is the larger one and should be insensitive for safety, and to detonate it you have a smaller powerful and sensitive charge which you apply when ready to detonate.
We see this in for example mining where they first place the more stable TNT where they want to detonate, and then add the smaller powerful and sensitive blasting cords when they prepare to detonate. This avoids having a lethal charge as much as possible until the time is ready to detonate.

Explosives have the following classifications to help understand which role they are suitable for:
Primary explosive - these are extremely sensitive to shock, friction and heat.
Secondary explosives - these are relatively insensitive to shock, friction and heat.
Tertiary explosives - these are so insensitive to shock that they cannot be reliably detonated by practical quantities of primary explosives and need an intermediate secondary explosive or booster charge.

Notice however that this is a sliding scale and some explosives are on the border between different classes. And there are also differences in sensitivity to shock, friction and heat.
So an explosive being for example a secondary doesn't necessarily mean that it is perfectly safe to handle and cannot detonate in the lab settings unless one is careful and takes the proper precautions.
And there may be great differences between primaries in sensitivity.

Pyro Valence:[12, 13]

Now as said earlier there are fuels that give electrons and oxidizers that receive electrons. And there is an index to indicate whether an explosive is a fuel or oxidizer, this index is called pyro valence.
A positive pyro valence number means it is a fuel and negative pyro valence means it is an oxidizer. An explosive that would have a zero pyro valence means it is neither oxidizer or fuel, it means the explosive provides and receives its own electrons in a balanced manner.

[12] "Advanced Explosive Design [p1]", Dugan Ashley, 11 Jan 2024
https://www.youtube.com/watch?v=I_O-4M0_dsM
[13] "AED [p1]", Dugan Ashley, 12 Jan 2024 https://www.youtube.com/watch?v=pnJlfCe_7Rg

Typically if you combust a singular explosive material that is either fuel or oxidizer it is going to interact with the air to achieve redox. But this is often not the most efficient way to achieve redox, meaning depending on the interaction with air “slows” or “depresses” the reaction so that it doesn’t achieve maximum efficiency or power.
The ideal is that as much explosive material detonates as fast as possible, and for that there needs to be a balance of electron providing and receiving.
And this can cleverly be achieved by combining and balancing fuels and oxidizers. Because in this mixture of explosive material one component provides and the other can receive in a balanced manner, leaving neither extra electrons or an electron deficit.

The balancing is done by first balancing the pyro valence index for the two materials. For example: one explosive has -2 and the other has +4. This means you need two molecules of explosive 1, for each molecule of explosive 2.
And then you use weight to molar ratio (molar mass) to convert it into weights. And then calculate how much each material weighs in relation to the total weight of both materials.
This gives the percentages (in weight) needed to have a balanced explosive.

If you are unfamiliar with chemistry and terms like “molar mass” then I highly recommend you read the following chapter “basic chemistry” first.
To find the pyovalence index of an explosive there are two ways; you either find it listed in some paper, or you calculate it on your own.
To calculate a pyro valence index of a molecule you simply count the pyro valence for each atom and then add together for the net pyro valence of the molecule.

Note: the pyro valence of an atom depends on what the assumed end products are in the reaction.
Meaning the explosive materials pyro valence depends on the end product of the combustion.
Normally though most atoms have a regular assumed end product they go to. So there’s a standard table of pyro valence for atoms that is accurate for most explosives.
But there are a few exceptions like; RDX and HMX.
Normally carbon atoms go to carbon dioxide (CO_2) molecules, which would give RDX and HMX positive pyro valence.
But when detonating RDX and HMX the carbon goes to carbon monoxide (CO), and in this case the pyro valence is actually 0. This explains the strong explosive performance of RDX and HMX, because they have a net pyro valence of 0.
All this to say: you calculate the pyrovalence by each atom's presumed end product, unless you have reason to think it is something else. And this is something that experts determine and needs to be found in an academic paper or similar.

In appendix 4: I give lists of pyro valences for the standard assumed end products.

But often occurring elements and their pyro valence is:
Element; Pyro valence; Assumed End Product
Al +3 Al_2O_3
C +4 CO_2 (end product is CO for HMX and RDX)

Cl -1 HCl, KCl, other metal chlorides
H +1 H_2O
N 0 N_2
O -2 H_2O, metal oxides

Examples of calculating pyro valence:

Glucose
C6 H12 O6
4*6 + 1 * 12 - 2 * 6 = 24 + 12 - 12 = 24
Pyro valence of glucose: +24 (fuel)

TNT
C7 H5 N3 O6
4 * 7 + 1 * 5 + 0 * 3 - 2 * 6 = 28 + 5 - 12 = 21
Pyro valence of TNT: +21 (fuel)

HMX (if C goes to CO, then the valence for C is +2, which is correct for HMX)
C4 H8 N8 O8
2*4 + 1*8 + 0*8 - 2 * 8 = 8 + 8 + 0 - 16 = 0
Pyro valence for HMX: 0 (already balanced, meaning good efficiency)

RDX (if C goes to CO, then the valence for C is +2, which is correct for RDX)
C3 H6 N6 O6
2*3 + 1*6 + 0*6 -2*12 = 6 + 6 + 0 - 12 = 0
Pyro valence for RDX: 0 (already balanced, meaning good efficiency)

ETN
C4 H6 N4 O12
4*4 + 1*6 + 0*4 - 2 * 12 = 16 + 6 + 0 -24 = -2
Pyro valence for ETN: -2 (oxidizer)

EGDN
C2 H4 N2 O6
4*2 + 1*4 + 0*2 - 2*6 = 8 + 4 + 0 - 12 = 0
Pyro valence for EGDN: 0 (already balanced, meaning good efficiency)

Ammonium Perchlorate
N H4 Cl O4
0*1 + 1*4 -1*1 -2*4 = 0 + 4 -1 - 8 = -5
Pyro valence for Ammonium Perchlorate: -5 (oxidizer)

Examples of calculating and balancing explosives with pyro valence:

Ammonium Nitrate + Aluminium
Ammonium nitrate Pyro valence: N H4 N O3 → 0 + 1*4 + 0 - 2*3 = -2
Aluminium Pyro valence: Al → +3
To achieve a balance of 0 we need:
3 NH4NO3 + 2 Al
Molar mass of NH4NO3: 80.043 g/mol
Molar mass of Al: 26.982 g/mol
Total weight: 3 * 80.043 + 2* 26.982 = 240.129 + 53.964 = 294.093
Ratio of weight for ammonium nitrate: 240.129/294.093 ≈ 0.817
Ratio of weight for aluminium: 53.964/294.093 ≈ 0.183

Basically if making a 10kg bomb with ammonium nitrate and aluminium, then you need ca 8.2 kg ammonium nitrate and 1.8 kg aluminium. This will achieve greater synergy and explosive efficiency. "More bang for your buck."

Notice that one can verify their answer by checking that you get a correctly assumed end product, meaning the end product is even as well. This step is not necessary and is only mentioned in passing if you want to verify that you have gotten the pyro valence wrong for a material.
Example of verifying the formula:
3 NH4NO3 + 2 Al = 3 N2 6 H2O Al2O3

N 6	N 6
H 12	H 12
O 9	O 9
Al 2	Al 2

As we see we can find a balance of assumed end products that have each and every single element. If one couldn't, meaning there is material left over that doesn't have others to reach its assumed end state, then there's a problem with the pyro valence.

Ammonium Perchlorate + Glucose
NH4ClO4 + C6H12O6
Pyro valence:
-5 +24
Formula for net zero pyro valence:
24 NH4ClO4 + 5 C6H12O6
Molar mass:
117.49 g/mol 180.156 g/mol
Total weight:
24 * 117.49 + 5 * 180.156 = 2819.76 + 900.78 = 3720.54
Ammonium Perchlorate weight ratio: 2819.76/3720.54 ≈ 0.758

Glucose weight ratio: 900.78/3720.54 ≈ 0.242
Basically for a 1kg bomb using ammonium perchlorate and glucose, you want 758 g and 242g of each respectively.

Ammonium Nitrate + Nitromethane
NH4NO3: 0*1 + 1*4 + 0*1 -2*3 = [-2], molar mass: 80.043 g/mol

CH3NO2: 4*1 + 1*3 + 0*1 -2*2 = [+3], molar 64.01 g/mol

Formula:
3 NH4NO3 + 2 CH3NO2
Total weight:
3*80.043 + 2*64.01 = 240.129 + 122.08 ≈ 362.20
Ammonium nitrate ratio: 240.129/362.20 ≈ 0.663
Nitromethane ratio: 122.08/362.20 ≈ 0.337

So to correctly prepare ammonium nitrate and nitromethane (also called ANNM) you need 66.3% of the weight to be ammonium nitrate and the rest be nitro methane. Simplified way to write this:
AN + NM
66 / 34

Ammonium Nitrate + Fuel/Oil [ANFO]
NH4NO3 80.043 g/mol [-2]
Fuel Oil (CH2)n 14.000 g/mol [+6]
3 * NH4NO3 + 1 * CH2
3 * 80.043 + 1 * 14.000
240.129 + 14 = 254.129
AN ratio: 240.129/254.129 ≈ 0.945
Fuel Oil ratio: 14/254.129 ≈ 0.055
So for a truck bomb using 100kg ANFO, you need 94.5kg AN and 5.5 kg Fuel Oil.

Last note on pyro valence

Pyro valence and oxidation state are the same thing. But sometimes they express the same thing differently.

Again: with pyro valence: positive numbers are fuels, negative numbers are oxidizers.
Often oxidation states will describe oxidizers with positive numbers and fuels with negatives.

And so remember that most public research and what is talked about on the internet is probably an oxidation state which could be the reason why they give a reversed number, meaning instead of +5 they might say -5.
So always check if they are talking about pyro valence or oxidation state.

You can also check how they list clear oxidizer or fuels to see which they assign positive or negative numbers.
But the integer is always the same size.

Basic Chemistry

Theory

Whenever making explosives you are conducting chemistry and there are two parts, the theory and the operations.
Theory simply involves how you use formulas and calculate.
Formulas will use the assigned letter of a chemical from the periodic table, and usually use arrows to show in which way the reaction travels. And text in parentheses to describe in which state the substance is in. s = solid, l = liquid, g = gas, aq = dissolved in water.
Example: 2 Na (s) + 2 H_2O (l) → 2 NaOH (aq) + H_2 (g)

Now that you have a balanced formula you can start to calculate things from it. Remember you either find a complete formula from a source, or you figure out the input and out products and then balance the equation.
To calculate things about the substances we need to find the different properties of the chemicals, and most relevant will often be:

Molar mass: (M = molar mass, m = weight, n = moles)
m/n = M
When you want to calculate weight or moles you use molar mass. Molar mass is the weight for each mole, and mole is just a number of atoms (and the relation between chemicals is the same for moles or single atoms).
Example: Ca (s) + 2 H_2O (l) → $Ca(OH)_2$ (aq) + H_2 (g)
If you wanted to calculate the weight of the end product, one way is to do it in relation to the starting product.
So:
Ca molar mass: 40.078 g/mol
$Ca(OH)_2$ molar mass: 74.093 g/mol
One atom of Ca and $Ca(OH)_2$ has the same relation, corresponding, to one mole of each. 1:1.

So ca: 40g calcium per 74g calcium hydroxide. Or ca 0.54 g calcium per g calcium hydroxide.

Density: (p = density, m = weight, V = volume)
P = m/V
When you use liquids it is sometimes preferable to use volumes rather than weight. In these cases you simply calculate a weight and find the corresponding volume.
Example: $Ca\ (s) + 2\ H_2O\ (l) \rightarrow Ca(OH)_2\ (aq) + H_2\ (g)$
How much water do we need at least per g Ca?
2 moles of H_2O, molar mass is 18.0153 g/mol, density is 1 g/cm^3
2*18.0153 / 1 (divide weight with density) = 36.0306 cm^3
36.0306/40 ≈ 0.9
So one needs 0.9 cm^3 water per g of calcium.

Now for example if we want to produce 100g of $Ca(OH)_2$. We know that we need: (100*0.54) 54 g of Calcium and at least (54* 0.9) 48.6 cm^3 of water.

A lot of chemistry of making explosives involves some common operations that you should be familiar with before attempting them:
Distillation
Refluxing
Filtering (gravitational, vacuum)
Titration
Nitration
Recrystallization
Displacement Reaction
Double Displacement Reaction
Reverse Double Displacement Reaction
Electrolysis
Electric Arc
Thermolysis (thermal decomposition)

And terms like:
Exothermic
Endothermic
Oxidation state
Fume hood
Dump-bucket
Decant
Gravitational filtering
Vacuum filtering
Runaway
Anode
Cathode

Electrode
Partitioned cell
Unpartitioned cell
In situ

I suggest reading and familiarization with these especially before trying them. And ideally try these procedures with non-dangerous chemicals first.

For example a safe way to make sure you can perform a distillation is setting up a distillation set, and then seeing if you can distill water successfully without any vapor leaks. Check if it's air tight.

How to find chemicals

Consumer Product Information Database (CPID).

CAS Number:
A CAS Registry Number is a unique number assigned by Chemical Abstracts Service (CAS) in the US to every chemical substance.

Safety Data Sheet (SDS)
Material Safety Data Sheet (MSDS)
Product Safety Data Sheet (PSDS)
Are all data sheets for chemicals, materials or products, they offer information on how to safely use them, but also useful specifics like the contents.

Common Compounds

Distilled Water

Distilling water helps remove impurities like minerals, salts, bacteria and chemicals that don't evaporate with the water.
So simply place water in a distillation station and heat and distill over all the water.

Hydrogen Gas

Electrolysis of normal water generates hydrogen gas at the cathode and oxygen gas at the anode.

Electrolysis of salt water will generate hydrogen gas at the cathode. This reaction is further explained in "hydroxides". Notice this will also produce poisonous chlorine gas.
or
React an acid with aluminium foil, ex hydrochloric acid with aluminium foil.
6 g aluminium foil and 12 ml hydrochloric acid, produces 1 balloon of hydrogen gas.

Hydrogen gas mixed with the oxygen in air can explode. So keep the number of balloons down and keep them away from open flames when handling.

There are also going to be several methods mentioned for other chemicals that also produce hydrogen gas. There are a lot of methods and so it is not hard to find in this work or on the internet other methods of generating the gas, and that applies to CO_2 and O_2 as well.

Charcoal

Charcoal is readily available and cheap.

Just make sure to grind it into powder if needed.

But you can also make it yourself:
Put wood in a metal container. have a small hole on top of the container.
The hole prevents gas build up in case the wood burns. It also helps you see if smoke is coming from inside the container, in that case the wood is burning, which it should not.

Make a large bonfire and put the metal container on it.

Let the bonfire go for about 3-5 hours.
If needed, go longer.
The ideal for the end product, is that the wood in the container becomes, pitch black, weighs extremely light, is very dry, fragile and makes “crunching noises” when broken.

Let the metal container cool down and take out your end product.
Grind into powder.

Sulfur

Sulfur is cheap and can easily be purchased in many places.
It is sold in garden centers as “garden sulfur” , a type of fungicide/pesticide.
It is also sold in some pharmacy powders. Sulfur ointments.

Hydroxides

Commonly available to be bought, but these can be made by adding alkali metals to water.
Notice that doing so can cause explosions, so do very small amounts, ideally in plastic containers rather than glass.

The common one is sodium hydroxide often called caustic soda or lye.
Potassium hydroxide is sometimes called potash lye or caustic potash.

Hydroxides are generally corrosive and can damage your skin.
Use gloves, sleeves, and eye protection.

Sodium hydroxide melts at 323°C. Some reactions use molten sodium hydroxide. It is important to know that glass cannot handle molten sodium hydroxide well.
So if doing reactions involving melting sodium hydroxide you need to use metal or steel containers.

A simple way of making your own sodium hydroxide and chlorine gas involves:

Electrolysis of sodium chloride in water using partitioned cells.
Meaning you have two containers connected by one or two “bridges”. And then use electrolysis on the salt-water.
The anode (positive charge) will generate the chlorine gas, so place the balloon or gas container for the chlorine gas on this end.
The cathode (negative charge) will generate hydrogen gas, so if you want to collect this as well then add a gas container for this as well.
The result is that the sodium chloride water mixture becomes a sodium hydroxide and water mixture.
For this reaction the best electrodes to use are graphite or titanium.

To make anhydrous sodium hydroxide you can place it in a metal container and melt it. The result is that any water present or trapped inside will vapor off.

Carbonates and Bicarbonates

These are also often very easy to buy. Especially the alkalimetal variants.
Carbonates can often be prepared by thermal decomposition of bicarbonates: (15 min)
$2\ NaHCO_3 \rightarrow Na_2CO_3 + CO_2 + H_2O$ 100-200°C
$2\ KHCO_3 \rightarrow K_2CO_3 + CO_2 + H_2O$ 120-200°C
$Ca(HCO_3)_2 \rightarrow CaCO_3 + CO_2 + H_2O$ 100°C (In solution)
If one is inclined to try and prepare alkali metals to carbonates or bicarbonates then the Solvay Process might be the only realistic way.
Sodium carbonate is often called soda ash. Meanwhile sodium bicarbonate is often called baking soda.

Nickel (II) Carbonate and Aminoguanidine Bicarbonate may be harder to come by. But they might be possible to be bought on online pyrotechnics websites or chemical suppliers:
https://www.pyrochemsource.com/
Otherwise one can try and produce them oneself:

Nickel (II) Carbonate[14]
The hexahydrate NiCO3•6H2O is claimed to form upon electrolysis of nickel metal under an atmosphere of carbon dioxide. Green and yellow forms of anhydrous NiCO3 form when aqueous nickel chloride solutions are heated under high pressures of carbon dioxide.

Basic nickel carbonate can be made by treating solutions of nickel sulfate with sodium carbonate:
4 Ni + CO3 + 6 OH+ 4 H2O → Ni4CO3(OH)6(H2O)4

The hydrated carbonate has been prepared by electrolytic oxidation of nickel in the presence of carbon dioxide:
Ni + O + CO2 + 6 H2O → NiCO3(H2O)4

[14] “Nickel(II) carbonate”, Wikipedia, 24 June 2025 https://en.wikipedia.org/wiki/Nickel(II)_carbonate

Aminoguanidine Bicarbonate[15]

Aminoguanidinium bicarbonate can be prepared by reacting calcium cyanamide with hydrazine sulfate. It can also be easily prepared by reducing nitroguanidine with zinc powder. Diachrynic used this route obtaining a great yield:
41.14 g zinc powder (629 mmol, 3.3 molar eq.) are weighed and put to the side. Into a reaction flask of at least 500 mL are put 20.00 g nitroguanidine (192 mmol, 1 molar eq.) and 47.62 g of ammonium sulfate (360 mmol, 1.88 molar eq.) in 285 mL of water. The suspension is stirred and not everything dissolves, this is expected. The reaction flask is immersed in an ice bath and equipped with magnetic stirring and a thermometer. Stirring is started. Once the solution reaches 10 °C the addition of small spatulas of zinc powder at a time is started. Monitor the exotherm and don't add too much at once, however the reaction is fairly easy to control. 3-4 spatulas of zinc can be added at a time, making the temperature jump up by 5-8 °C. The reaction was kept between 5-15 °C, leaning to the latter temperature. The complete addition of zinc took about 1 hour, during which the ice bath was refilled just once. Afterwards the reaction was left stirring at about 15 °C for a further 30 minutes. The pH rose to about 8-9. Using a fritted vacuum filter the zinc oxide sludge was removed, it filtered fairly easily. The yellow colored filtrate is put into a flask with magnetic stirring, and 8.57 g of 25% ammonia solution (126 mmol, 0.66 molar eq.) are added as well as 28.57 g of sodium bicarbonate (340 mmol, 0.94 molar eq.) with stirring, it dissolves after a short while. The solution is left standing for 12 h during which the aminoguanidine bicarbonate slowly precipitates. Afterwards the product is vacuum filtered off and air dried.
Yield of aminoguanidine bicarbonate: 15.700 g (115 mmol, 60% based on nitroguanidine)

Nitrites

Nitrites can be prepared often by thermal decomposition of nitrates: (15 min)

$NaNO_3 \rightarrow NaNO_2 + O_2$	380-500°C
$KNO_3 \rightarrow KNO_2 + O_2$	400-600°C
$Ca(NO_3)_2 \rightarrow CaO + 2NO_2 + ½\ O_2$	500°C
$Cu(NO_3)_2 \rightarrow CuO + 2NO_2 + ½\ O_2$	170-200°C
$AgNO_3 \rightarrow 2Ag + 2NO_2 + O_2$	200-250°C

Sodium nitrite can be found in food additives.
Potassium nitrite can be found in fertilizer, stump removers, and food additives.

Wikipedia:[16]
Sodium nitrate and calcium sulfite, can be mixed and heated, in a solid state, to make sodium nitrite and calcium sulfate.
$NaNO_3 + CaSO_3 \rightarrow NaNO_2 + CaSO_4$

[15] "Aminoguanidinium bicarbonate", Sciencemadness, 7 May 2021, https://www.sciencemadness.org/smwiki/index.php/Aminoguanidinium_bicarbonate
[16] "Sodium nitrite", Wikipedia, 15 Aug 2025 https://en.wikipedia.org/wiki/Sodium_nitrite

Nitrogen oxides can also react with sodium hydroxide, to make sodium nitrite and water:
$2\ NaOH + NO_2 + NO \rightarrow 2\ NaNO_2 + H_2O$
$2\ NaOH + N_2O_3 \rightarrow 2\ NaNO_2 + H_2O$

One method uses molten sodium nitrate as the salt, and lead which is oxidized, while a more modern method uses scrap iron filings to reduce the nitrate.
NaNO3+Pb⟶NaNO2+PbO

Nitrates

Nitrates can simply be made by adding an alkali metal salt (NaCl, NaOH, KCl, KOH, etc) to nitric acid.
Nitrates are useful because when mixed with sulfuric acid it makes nitric acid.
The alkali metal nitrates are usually pretty weak explosives, and need balancing with fuels, pressing, and blasting caps to trigger correctly.
Meanwhile the other nitrates are generally decent explosives.

Sodium nitrate is sometimes called nitrate of soda. Can be bought as fertilizer or food preservatives.
Potassium nitrate can be found in stump removers.
Calcium nitrate is found in fertilizer.
Calcium ammonium nitrate is found in fertilizer.
Ammonium nitrate is found in fertilizer and cold packs.
Urea nitrate is found in fertilizer.

To extract the potassium nitrate from the stump remover:

1 Simply add the stump remover to water and heat it up until it all dissolves.
2 Once everything is dissolved, let the water cool down, this will make the potassium nitrate precipitate
3 Filter and Collect the potassium nitrate.
(4) The side product of liquid could still contain some potassium nitrate, so one should consider leaving it in a hot place, like outside in contact with the sunlight or in a hot car, ideally both, to see if anymore precipitates.

Extracting Ammonium Nitrate from Fertilizer

This process is very simple and could be the most preferable.

1 Fill a beaker or bucket with water, depending on the volume you're trying to yield.

2 Pour your fertilizer into the bucket of water and mix thoroughly. The water will dissolve the ammonium nitrate because ammonium nitrate has a very high solubility.
3 Once the fertilizer is dissolved in the water. Filter it through a coffee filter.
4 Boil the remaining liquid until its ¼ or ⅛ of its volume. The goal is to boil away the water, which can be noticed when the liquid becomes more syrup-like in consistency.
5 Pour the remaining syrup-like liquid into a baking pan or tray, or a towel or desiccator bag that can handle this heat.
6 Let the ammonium nitrate cool and dry, which will let it crystallize.
7 Once crystalized, break down the crystals, to get rid of large chunks.
Alternatively let the container cool first, which lets the ammonium nitrate crystalize, then scrap it into a towel for the final drying process.

Extracting Ammonium Nitrate from Cold Packs.

There are different types of Cold packs, but the process of extracting ammonium nitrate is similar. There are cold packs with ammonium nitrate and some extra anti-caking agent, then there are cold packs with ammonium nitrate, calcium carbonate and anti-caking agent. These types of cold packs have ammonium nitrate and it can be extracted.

The process which can be used to extract ammonium nitrate from both types of cold packs is:

1 Add all the solids of the cold packs into a beaker.
2 Add enough water to dissolve all of the solids in the beaker. Ammonium nitrate dissolves around 118 grams/100 ml, so one needs 100 ml for each 118 grams of weight, then just divide the weight with 118 and add that many 100 milliliters of water.
3 Once all the chunks are broken down and all of it is one liquid, which can be sped up with stirring. Let the mixture sit until the “non ammonium nitrate” precipitates at the bottom of the beaker.
4 Decant the water above the solids at the bottom.
5 Filter the liquid that has just been decanted.
6 Boil the liquid, to remove the water. Notice that ammonium nitrate decomposes at 210 degrees celsius, so keep the temperature below that, but notice also that ammonium nitrate melts around 170 degrees celsius, this means that once the temperature rises to 170 degrees, all that remains is essentially pure liquid ammonium nitrate.
7 Pour the ammonium nitrate onto a baking pan or tray and let it crystallize.
8 Scrape the remains and break the chunks, either by hand with a towel or with a mixer.

Alternatively one could let the ammonium nitrate solidify in the beaker used in the boiling step, by just letting it cool off after reaching 170 degrees celsius, one would then just have to scrape it off from a beaker instead of a baking pan or tray, possibly into a towel to let it completely dry and break the chunks.

Notice: When filtering the cold packs with calcium the solids are almost entirely calcium carbonate. The calcium carbonate can be collected and used, for example to make Armstrong's mixture.

Methods of synthesis for nitrates will be covered in the section “Synthesis and Applicability of Explosives”.

Sulfates

Sulfates are made simply by reacting alkali metal salts with sulfuric acid.
Sulfates are generally useful as they can be used to produce sulfuric acid, or other compounds.

Sodium sulfate is also known as sulfate of soda. Sodium sulfate 10-hydrate is called Glauber’s salt or mirabilite.
Potassium sulfate can be found in fertilizer.
Calcium sulfate can be found as a dihydrate in gypsum.
Copper sulfate is found in fungicide, herbicide, and pool cleaner. Root killers usually have copper sulfate pentahydrite.
Ammonium sulfate is found in fertilizer.
Lead Sulfate is found in sulfated battery/old used battery. Old car batteries are a good place to look, but caution since lead is poisonous.

Bisulfates

Bisulfates can be reduced to sulfates.

Sodium bisulfate can be found in Ph reducers for pools, cleaning products and food additives.

Sulfamates

Ammonium Sulfamate, found in herbicides or fire retardants

Chlorides

“Normal” salt can be bought anywhere. Or you neutralize an alkali metal hydroxide with chloride gas.

NaCl, table salt.
KCl

NH_4Cl, salmiac.

Hypochlorites

Sodium hypochlorite is found in bleaches, deodorants and disinfectants.
Calcium hypochlorite is found in bleaches, deodorants and disinfectants.

Hypochlorites are irritants and can cause damage to skin, eyes and the inside of the mouth, and it can irritate the lungs.

Chlorites

Are intermediaries between hypochlorites and chlorates, when using electrolysis to add oxygen to the compound.

Chloride - Cl
Hypochlorite - ClO
Chlorite - ClO_2
Chlorate - ClO_3
Perchlorate - ClO_4

As said mixing chlorine based chemicals, commonly the alkali metal variants, in water and applying electrolysis in an unpartitioned cell will make it increase its oxygen count.
Chlorates and perchlorates are explosive.
Especially Perchlorates.

You can find sodium chlorite used in industrial bleaching processes.

Hydrogen Peroxide

Hydrogen peroxide is easily bought with ranging concentrations. Ideally you want industrial grade concentration which is 30%. Though most commercial hydrogen peroxide is between 5-10% hydrogen peroxide which can work.
Concentrations above 30% will decompose and slowly degrade into 30% concentration. 30% is the highest concentration you can maintain in a normal environment.

The industrial process for hydrogen peroxide, the anthraquinone process, is too elaborate for a lab procedure.

It is theoretically possible to generate hydrogen peroxide by electrolysis of water. But this is something currently being researched. And so any method which does achieve hydrogen peroxide has incredibly low yield.

Another method is the ammonium persulfate method:
Ammonium persulfate + water → ammonium bisulfate + hydrogen peroxide
Ammonium bisulfate + sulfuric acid + electrolysis → ammonium persulfate
Basically water and sulfuric acid is consumed for hydrogen peroxide.
But this is an even worse method. It consumes expensive useful material like sulfuric acid and has a bad yield of hydrogen peroxide.

Another method is heating sodium salts, like sodium hydroxide, sodium carbonate or sodium bicarbonate, and decomposing these into sodium oxide. Then heating even more ideally in an oxygen rich environment, blowing or applying oxygen. Producing sodium peroxide.
Sodium peroxide reacts with water to produce hydrogen peroxide and sodium hydroxide.
$Na_2O_2 + 2\ H_2O \rightarrow 2\ NaOH + H_2O_2$

Sodium carbonate and bicarbonate can just normally be thermally decomposed, meaning just heated.
$NaHCO_3$ (sodium bicarbonate) starts to decompose to Na_2CO_3 (sodium carbonate), starting around 50°C and completes at around 100°C.
Na_2CO_3 can also be decomposed, starting at room temperature, and is completed at 851°C. This produces Na_2O (sodium oxide).
Regular lighters burn around or over 1000°C. Can also use a Bunsen burner.

Using sodium hydroxide you instead heat it to its melting point 323C and use electrolysis to achieve pure sodium.
Sodium is oxidized to sodium hydroxide by the water in the air by itself. So you need to heat it to 250C, which will favor the formation of Na2O. And to help it achieve further oxidation to Na2O2 you can apply/blow oxygen on it. And continue the heated reaction with oxygen for a long time.

"$2\ Na + O_2 = Na_2O_2$
In preparing Na_2O_2 it is advantageous to oxidize metallic Na to Na_2O in an atmosphere containing less O_2 than air. The Na_2O is then oxidized completely to Na_2O_2 in an atmosphere containing more O_2 than air, at temperatures ranging from 200 to 350°C. If the Na_2O is ground before the second oxidation step (to facilitate the reaction), air moisture must be excluded during grinding and reaction.

Properties:

Yellowish. M.p. 460°C (does not decompose). Forms H_2O_2 with H_2O. At red heat decomposes, evolving O_2. d. 2.47. Structure probably similar to Hg(l) halides ($D3_1$ type).”

The best option is buying/stealing it and concentrating it.
You can concentrate hydrogen peroxide by gently heating it. 60 degrees celsius at max. To gently evaporate the water. But this is not recommended as hydrogen peroxide is a really reactive substance and increasing its heat increases its desire to decompose.
Even small concentrations of hydrogen peroxide lose strength when stored warm.
Preferably you can either use reduced pressure to concentrate it at a cooler temperature.
One option is the partial freezing. Meaning you freeze it until ice starts to form and then filter and collect the unfrozen liquid (which is H_2O_2 enriched). And then you repeat this step over and over again.
But again the ideal method is to reduce the pressure, to help evaporate the water in lower temperatures.

Again for most use you can probably just use commercial low grade hydrogen peroxide. Though this might affect yield and reaction time. So I suggest seeing if you can find industrial grade.
It is very hard to make it yourself and tedious to concentrate it yourself.

Nitric acid

Nitric acid is the common name for hydrogen nitrate, which has the chemical formula HNO_3.
Other names for nitric acid are saltpeter acid, spirit of niter and aqua fortis (latin for “strong water”).

The chemical melts at -42 degrees celsius and boils at 83 degrees celsius. This means that at room temperature it is a liquid.

Commercially most nitric acid comes diluted with water. Most commercially available nitric acid is around 68% in concentration.

The concentration of a nitric acid solution can be increased with distillation.
There are different variants of distillation, the best one for distilling water from nitric acid would be fractional distillation, but simple distillation also works. This will typically achieve 68-70% purity.
Notice, water has lower boiling point than that of nitric acid, thus it vaporizes first.

Distillation can also be part of the synthesis process.
For an example, if mixing sulfuric acid and potassium nitrate, nitric acid will form and can be directly distilled over. Water can also be added to help vaporize the nitric acid (not recommended for high purity). Although the purity of nitric acid will decrease, depending on how much water you add, 68% purity could

still be achieved, but fractional or simple distillation may be needed after that. So just distill the nitric acid without any use of water, if high purity is desired.

Terms like “fuming nitric acid” describe high concentration nitric acid compositions. “Red fuming nitric acid” usually describes nitric acid with a concentration greater than 86%. “White fuming nitric acid” usually describes nitric acid with a concentration greater than 95%.
A test to see if it is red fuming nitric acid, meaning above 86% purity, is to drop it on a nitrile glove, which will only catch fire if the concentration is at least 86%.

In 2019 the EU has officially restricted the sale of nitric acid. A member of the general public can only buy nitric acid with a concentration of 3% by weight. A person that has acquired the license to use higher concentrations may buy or possess nitric acid with a concentration of 10% by weight.

When working with nitric acid, some operations are more safely done without nitrile gloves. This is because nitric acid reacts with nitrile gloves and sets them on fire.

Most processes to make nitric acid have low concentrations and you can only increase the concentration to 68% with distillation. To further increase the concentration of nitric acid you want to add sulfuric acid, which draws out the water. Adding concentrated sulfuric acid can make nitric acid reach 99%.
But there are some processes which pretty much achieve pure nitric acid, notice though that if needed you can add concentrated sulfuric acid to increase it even more.

Ways of synthesizing nitric acid are:

1 Electricity, Air and Water Method (Nitrogen Dioxide and Water method):[17, 18]

$N_2 + O_2 \rightarrow 2\ NO$
$2\ NO + O_2 \rightarrow 2\ NO_2$
$3\ NO_2 + H_2O \rightarrow 2\ HNO_3 + NO$

If air is blown/sucked through an electric arc some of the nitrogen reacts with oxygen forming nitrogen dioxide. If nitrogen dioxide is then blown/sucked through water then it will dissolve or gather in the water, and produce nitric acid.
This process may take weeks, but is able to generate nitric acid with about 20% concentration. Nitric acid can be further concentrated through distillation. Distillation can increase the concentration to around 68% to achieve further concentration likely requires pure sulfuric acid (which can simply be boiled to pure form from dilute sulfuric acid).

Doing this method, it is advised to see if it’s possible to have the nitrogen monoxide travel back into the electric arc chamber, so that it is oxidized again and is recycled.

This is called:

[17] “Nitric Acid From Thin Air”, Cody’sLab, 10 Aug 2015 https://www.youtube.com/watch?v=ep23ds4cZs4
[18] “Making Nitric Acid From Air (DIY Birkeland-Eyde Reaction", DBX Labs, 2 Aug 2020 https://www.youtube.com/watch?v=4spP-L-RuGY

Birkeland-eyde Process
Birkeland eyde reactor

2 Ammonium nitrate and Sulfuric acid Method:

NH4NO3 + H2SO4 → NH4HSO4 + HNO3

Mixing ammonium nitrate and sulfuric acid will generate a mixture with nitric acid that you can use for nitration. Having excess sulfuric acid will help dry the reaction.
If you need concentrated nitric acid then you need dry reactants.
Meaning if you want concentrated nitric acid then you need pure H2SO4 and dry/anhydrous ammonium nitrate. And if the reaction produces water then use excess sulfuric acid.

Ammonium nitrate can be made by ozonolysis of ammonia, and dried in an oven. And sulfuric acid can be bought or found as battery acid, or stolen, or synthesis from electrolysis of sulfate solutions or oxalic acid and sulfate reactions, and concentrated by boiling off the water.
So this method is an improvisable option to achieve pure nitration, from common materials.

3 Potassium Nitrate and Sulfuric Acid Method:[19]

$KNO_3 + H_2SO_4 \rightarrow HNO_3 + KHSO_4$

Mixing potassium nitrate and sulfuric acid will result in nitric acid and potassium bisulfate. Dealing with larger quantities, adding the sulfuric acid slowly may be advised as keeping the temperature low is ideal. The nitric acid can then be separated from the potassium bisulfate with distillation. The lower boiling point of nitric acid means that it transfers over first.
The distillation is complete once only the potassium bisulfate solid salt remains, and all the nitric acid liquid has been transferred over.

4 Calcium Nitrate and Sulfuric Acid Method:

$Ca(NO_3)_2 + H_2SO_4 \rightarrow 2\ HNO_3 + CaSO_4$

Mixing calcium nitrate and sulfuric acid, makes nitric acid and calcium sulfate. The nitric can then be separated and concentrated through distillation.

Similar steps as that of the potassium nitrate and sulfuric acid method, but calcium nitrate is used instead of potassium nitrate.

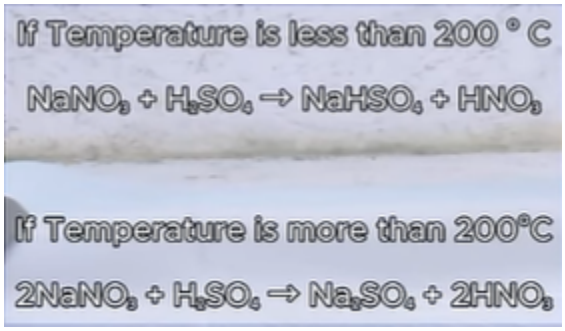
[19] “le Nitric Acid Still”, Dugan Ashley, 21 May 2025 https://www.youtube.com/watch?v=LB0dNvIbduA

One reason this method might be better is that more nitric acid is made per amount of chemicals used?

5 Sodium Nitrate and Sulfuric Acid Method:

$NaNO_3 + H_2SO_4 \rightarrow HNO_3 + NaHSO_4$ (if temperature is below 200°C)
$2\ NaNO_3 + H_2SO_4 \rightarrow 2\ HNO_3 + Na_2SO_4$ (if temperature is above 200°C)

Mix sodium nitrate and sulfuric acid, this makes nitric acid and sodium sulfate. The nitric acid can then be separated and concentrated through distillation.



Temperature/heat is important to begin the reaction, and distill pure nitric acid.

6 Copper Nitrate and Sulfuric Acid Method:

Copper nitrate and sulfuric acid, makes nitric acid and copper sulfate.
$Cu(NO_3)_2 + H_2SO_4 \rightarrow 2\ HNO_3 + CuSO_4$
Extra: Copper sulfate can be dissolved in water and undergo electrolysis, to make sulfuric acid and copper.
$2\ CuSO4 + 2\ H_2O \rightarrow 2\ Cu + 2\ H_2SO_4 + O_2$

Global reaction:
$2\ Cu(NO_3)_2 + 2\ H_2SO_4 + 2\ H_2O \rightarrow 4\ HNO_3 + 2\ Cu + 2\ H_2SO_4 + O_2$

Mixing copper nitrate and sulfuric acid, makes nitric acid and copper sulfate. Then through distillation extrapolate the nitric acid from the copper sulfate. Then dissolve the copper sulfate in water and let it undergo electrolysis, this will make copper and sulfuric acid.
For an overall reaction, copper sulfate and water is exchanged for nitric acid, copper and oxygen. The sulfuric acid is used and recovered in the reaction.

7 Sodium Bisulfate Method:

$2\ NaHSO_4 + 2\ KNO_3 \rightarrow 2\ HNO_3 + Na_2SO_4 + K_2SO_4$

Sodium bisulfate has a melting point of 315 degrees celsius. It is important that the sodium bisulfate is molten to make the reaction work.

Mix the sodium bisulfite and potassium nitrate powders. Put the mixture into a round bottom flask that is connected to a distillation station. Then heat up and melt the salts, this will create nitric acid gas among nitrogen oxides, these will then be distilled over and separated from the other salts.

It may be worth it to have a small amount of water in the receiving end of the distillation, that the gas is sucked into, because this will collect the nitric acid being passed over, but more importantly it will react with nitrogen dioxide to make even more nitric acid.
Or to have a series of collecting beakers. The first being empty to receive nitric acid. The second and third with a little water, to receive the nitrogen dioxide and turn it into nitric acid. Make sure to set up the last two beakers such that if water were to be sucked into the tubing, the water would just transfer between the 2 and 3 beakers. It's really important that water doesn't start moving backwards through the tubing, because of some pressure disparity, resulting in ruining the nitric acid batch in beaker 1.

Just make sure if you have a small amount of water the gasses are bubbled into, that it is a very small amount if you desire pure nitric acid.

This can also be done with the mixture of sodium bisulfate and sodium nitrate.

8 Compost Method:

This method is good for those with access to high amounts of fertilizer, compost or manure. Like people working on farms who might have some excess fertilizer.

How to extract nitrates from compost:
The idea is to filter the nitrates out of the compost, this can be done by pouring water on the compost, which will carry the nitrates with it through the filter, regular paper towel/coffee filter/towel can be used as filter.
But two extra steps help the process:
1 Add some potassium hydroxide to the water. This will increase the amount of potassium nitrate extracted.
2 heat up the water, to almost boiling point, after which pour it over the compost.
3 Prepare a new beaker with water and repeat step 1 and 2, to extract as much as possible.

Once you have a large amount of the nitrate "rich" compost extracted and dissolved in water.
Let it sit on a hot plate with low-medium temperature, so that the water evaporates.

Once it is dry, you have extracted the compost nitrates or nitrate "rich" compost.

How to distill nitric acid out of the compost nitrates:
Put the nitrate “rich” compost in a round bottom flask distill station, add concentrated sulfuric acid and distill over the nitric acid.
Make sure that the receiving end is airtight as it takes time for nitric acid fumes to condensate.

9 Pure Copper Nitrate Method:

Copper nitrate can be heated to the point where it decomposes into nitrogen dioxide and oxygen. These gasses can then be bubbled into water to form nitric acid.
Basically heat up copper nitrate to the point it decomposes and have an airtight distillation station for the gas to be transferred through. It is recommended to have a series of beakers to collect the gas. The idea is that the first beaker is empty and collects the nitric acid which will be condensating. Then there are one or more beakers with water, which will collect the nitrogen dioxide traveling through the system, to create even more nitric acid.

The main problem is to find copper nitrate. But copper nitrate can also be synthesized:
Mix calcium hydroxide, calcium ammonium nitrate and water. Then reflux the mixture for several hours. This is done to make calcium nitrate and to extract as much ammonia as possible out of the mixture.
If one is using or has pure calcium nitrate, then this step can be skipped.

In a separate beaker dissolve copper sulfate pentahydrate in water, once dissolved, add the prepared calcium nitrate solution. This will make copper nitrate and calcium sulfate.

Calcium sulfate will precipitate, making it possible to filter off. It is recommended to use a disposable filter since calcium sulfate is hard to get out of the filter once it’s there.

Filter the liquid and collect the calcium sulfate in the filter. Make sure to wash it with large amounts of water to really filter out all of the copper nitrate.

The copper nitrate and water solution may need to be distilled, to remove the excess water. The decomposition point of copper nitrate is higher than the boiling point of water. This makes it possible to boil and distill over the water.
The mixture will turn from the strong blue color to a more dark green-blue, emerald like color. This is the perfect time to stop.

The copper nitrate-water solution is ready for the final distillation already described, where it is decomposed into nitric acid. As already described above.

10 Nitrogen Oxide (NOx) Gas and Hydrogen Peroxide Method

Nitrogen oxide can be generated by exposing air to an electric arc.

$N_2 + O_2 \rightarrow 2\ NO$
$2\ NO + O_2 \rightarrow 2\ NO_2$

Hydrogen peroxide is used in processes involving nitric acid or the formation of nitric acid. For example, hydrogen peroxide is used for the control of nitrogen oxide (NOx) pollutants or their precursors, which results in the formation of nitric acid.

$2\ NO + 3\ H_2O_2 \rightarrow 2\ HNO_3 + 2\ H_2O$
$2\ NO_2 + H_2O_2 \rightarrow 2\ HNO_3$

Basically to synthesize nitric acid there are these alternatives:
1 Birkeland-eyde process, expose air to electric arc and pass the nitrogen dioxide gas into water.
1.1 Or passing the gas into a hydrogen peroxide solution to faster produce nitric acid.
2 Nitrate-sulfuric acid reaction, then use this solution for nitration or distill over the nitric acid.
2.1 Sodium nitrate and sulfuric acid
2.2 Calcium nitrate and sulfuric acid
2.3 Potassium nitrate and sulfuric acid
2.4 Copper nitrate and sulfuric acid
2.5 Ammonium nitrate and sulfuric acid
3 Extracting nitrates from compost and then converting it into nitric acid.
4 Decomposition of nitrates to create nitric acid gas.
4.1 Sodium bisulfate and potassium nitrate, heated up, decompose into nitric acid.
4.2 Decomposing regular nitrates will often create nitrogen dioxide gas, which can be passed onto water to make nitric acid. Can be done thermally or by adding oxalic acid.

Options 2 and 4.1 can create pure nitric acid in its distillation, as it directly produces nitric acid gas with heat.
Options 1 and 4.2, creates nitrogen dioxide gas which will need to be absorbed into water to generate nitric acid, and has a natural limit of 68%, to achieve higher concentrations one needs to add concentrated sulfuric acid.
For option 3 it depends on whether you use sulfuric acid and distill over pure nitric acid, or you distill over impure product and then add concentrated sulfuric acid.

Lastly 4.1 “Sodium bisulfate and potassium nitrate method” is a good alternative if you cannot find pure sulfuric acid.

Sulfuric acid

Sulfuric acid is the common name for dihydrogen sulfate, which has the chemical formula H_2SO_4.
It is sometimes alternatively spelled “sulphuric acid” from the commonwealth spelling.
It has also historically been referred to as “oil of vitriol”.

Vitriol is an old name for a certain group of sulfates.

Fuming sulfuric acid, also called oleum, is a term referring to the sulfur trioxide content (SO_3) in sulfuric acid (H_2SO_4) compositions. Sometimes it is referring to disulfuric acid ($H_2O_7S_2$), also called pyrosulfuric acid.

The chemical melts at 10.31 degrees celsius and boils at 337 degrees celsius, meaning it is a liquid at room temperature.

Sulfuric acid is miscible with water, which means it becomes one homogeneous liquid when mixed with water. Since sulfuric acid most often comes in a diluted form with water, its freezing temperature is lower than 10.31 degrees celsius.

Sulfuric acid is found in many different products commercially available, these vary in concentration depending on their purpose.

Battery acid, commonly used in batteries for vehicles, is 29-32% sulfuric acid.[20]
Chamber acid or fertilizer acid, is 62-70% sulfuric acid.
Tower acid or glover acid, is 78-80% sulfuric acid.
66-degree Baumé acid, is 93.2% sulfuric acid
Drain cleaner, used to drain clogged pipes, is 98% sulfuric acid.[21]

Sulfuric acid with a concentration lesser than 29% is often called diluted sulfuric acid.
Sulfuric acid with a concentration around 98.3% is often referred to as concentrated sulfuric acid.

If sulfuric acid is diluted only with water then the process to increase concentration is easy.
This is simply done by boiling and evaporating the same amount as concentration water.
For example, battery acid is most often 30% sulfuric acid and 70% water, thus boiling away 70% of the volume will give you approximately “concentrated” sulfuric acid.
Notice however, that some sulfuric acid will evaporate alongside the water, especially as the concentration and temperature increase. So precautions should be taken to make sure that one doesn’t breathe in any of the fumes, like doing it in a well ventilated area and using a fume hood.

[20] “Sulfuric Acid From A Car Battery”, Scrap Science, 18 Jan 2021
https://www.youtube.com/watch?v=wBUzGLEIIQw&list=WL&index=459
[21] “Purifying Sulfuric Acid Drain Cleaner”, NileRed, 17 Jan 2016
https://www.youtube.com/watch?v=4DUGRWjdNLI&list=WL&index=457

Some drain cleaners have a high enough concentration of sulfuric acid, around 98%, which means they can just be used directly. But it's also possible to extrapolate a purer form of sulfuric acid from drain cleaner, which may be relevant for some drain cleaners with smaller concentration.

As of August 2019, the European Union has officially restricted the purchase of sulfuric acid.
The general public can only be sold sulfuric acid to the limit concentration of 15% by weight. The only exception for possession of sulfuric acid with greater than 15% concentration, for a member of the general public, is that it's stored in a car battery.
Under certain circumstances, depending on state laws, a license can be acquired that permits the acquiring and possession of sulfuric acid to the limit concentration of 40% by weight. This license is what automobile related companies usually have so that they can install new battery acid in the car battery.
The regulation was done with the aim to increase traceability and to regulate many precursors for explosives. The regulation does not only regulate the purchase of certain explosive precursors, it also has protocols requiring economic operators, including all retailers, to register each transaction of sulfuric acid exceeding 15% by weight and to retain that data for 18 months from the date of the transaction. The reason for this is to have this data available for inspection at the request of authorities or law enforcement.

Some ways of synthesizing sulfuric acid are:

1 Copper sulfate method:[22]

$2\ CuSO_4 + 2\ H_2O$ (+electricity) $\rightarrow 2\ H_2SO_4 + 2\ Cu + O_2$

Copper sulfate dissolved in water can undergo electrolysis. This will cause the copper to stick to the copper cathode. Then hydrogen gas will stick to the sulfate ions making sulfuric acid.

The global equation is: $CuSO_4 + H_2O \rightarrow H_2SO_4 + Cu + ½\ O_2$
Basically oxygen will bubble out, excess water will remain, copper metal will stick to the cathode and sulfuric acid will remain with the water, as a result of hydrogen combining with the sulfate ions.

2 Magnesium sulfate (epsom salt) method:[23]

Similar to copper sulfate method, magnesium sulfate is added to water and undergoes electrolysis to generate sulfuric acid, metal and oxygen, in this case magnesium is generated.

[22] "Make Sulfuric Acid (Copper Sulfate Electrochemical Method)", NurdRage, 26 Dec 2009
https://www.youtube.com/watch?v=5dUSF9Gl0xE
[23] "Making Sulfuric Acid From Epsom Salt", Scrap Science, 4 Nov 2018
https://www.youtube.com/watch?v=6BThiJpbBJQ

3 Oxalic Acid and Sulfate Method:[24]

Oxalic Acid can be mixed with a copper sulfate solution to make sulfuric acid and copper oxalate:
$H_2C_2O_4 + CuSO_4 \rightarrow H_2SO_4 + CuC_2O_4$

Use an excess amount of moles of oxalic acid, at least 10-20%.

Copper oxalate is insoluble in water and should precipitate, but it doesn't matter if it doesn't.

Simple distillation can be used to collect the sulfuric acid solution, which will evaporate first.

To concentrate the mixture, boil it to evaporate the air. Don't breathe the white fumes.

The extraction and concentration of sulfuric acid can be done in one step. Do a distillation and discard the first distillates, which are going to be contaminated with a lot of water. Continue discarding if needed until white fumes appear. The white fumes signal that it's mostly pure sulfuric acid being transferred over at that point.
So once the white fumes appear, let the distillation finish and keep the distillate, which will be essentially pure sulfuric acid.
The remaining salt, which does not distill over, is the copper oxalate.

Oxalic acid can be made with sugar, water and (red fuming) nitric acid.

4 Hydrochloric acid and sulfate method:[25]

Mix hydrochloric acid and sodium bisulfate, when sodium chloride appears, filter the liquid from it. then distill over the sulfuric acid?

Usually sulfuric acid is mixed with chlorites to make hydrochloric acid and sulfates.

example:
$H_2SO_4 + NaCl \rightarrow HCl + NaHSO_4$

But this reaction is actually a balance:
$H_2SO_4 + NaCl \leftrightarrow HCl + NaHSO_4$

Then the idea is to remove the sodium chloride that might form, and remove the likelihood that H_2SO_4 is reacted back to HCl and Na_2SO_4.
This trick only works when the solubility of the salt produced alongside the sulfuric acid has very low solubility. Low enough to precipitate and lower than that of the counter salt.

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[24] "Making Sulphuric acid (Easiest way), Prussian Blue, 23 Dec 2022
https://www.youtube.com/watch?v=p7g4OyGuLV4
[25] "Making H2SO4 from Sulfates and HCL", Chemical Engineering, 20 Dec 2020
https://www.youtube.com/watch?v=XWTuRMQE02I&list=WL&index=24

Procedure:

mix hydrochloric acid and sodium bisulfate

$HCl + NaHSO_4 \leftrightarrow H_2SO_4 + NaCl$

When the sodium chloride has precipitated, filter the mixture, remove the sodium chloride, which can be used to make more hydrochloric acid.

This will cause an imbalance in the reaction and more H_2SO_4 and NaCl will be produced to balance it out. Then keep filtering it off, until satisfied.

5 Lead Sulfate Method:

Heating lead sulfate above 1000°C decomposes it to lead oxide and sulfur trioxide:
$PbSO4\ (s)\ (+\ energy) \rightarrow PbO\ (s) + SO_3\ (g)$

Lead sulfate has a melting point of 1087°C.
When lead sulfate melts, it decomposes to lead oxide and sulfur trioxide
Lead oxide has a melting point of 888°C, which means it will be a liquid in this reaction until it's cooled.
Sulfur trioxide is a gas, even at room temperature, and can be passed through water to make sulfuric acid:
$SO_3\ (g) + H_2O\ (l) \rightarrow H_2SO_4\ (l)$

Lead sulfate can be found in sulfated batteries.
Lead-acid batteries that are discharged will sulfate. If it is enough "uncharged" and for long enough time the battery will form more and larger sulfate crystals, the sulfate that is formed is lead sulfate. When a battery undergoes this it's called a "sulfated" battery, and can become inoperable and unrecoverable.
The lead sulfate is a white powder/crystal that gathers usually at the anodes.

This method is rather dangerous as lead sulfate is poisonous and the sulfur trioxide gas is harmful, and then boiling sulfuric acid mixtures cause dangerous fumes.
This method is only mentioned because if one searches old car batteries with proper protective gear, they might find a lot of lead sulfate which can be used.
So when looking at old car batteries you want the battery acid and lead sulfate.

6 Sodium bisulfate decomposition method:

Sodium bisulfate can be heated to 315°C which causes thermal decomposition. The sodium bisulfate will decompose into sodium pyrosulfate and water. Let the water evaporate.

Then heat the mixture to 460°C, this will cause further decomposition. And will produce sodium sulfate and sulfur trioxide vapors.
Pass the sulfur trioxide vapors to water to create sulfuric acid.

Hydrochloric acid

Hydrochloric acid is the common name for an aqueous solution of hydrogen chloride, with the chemical formula HCL.
Other names for hydrochloric acid are chlorane, muriatic acid, spirit of salt, hydronium chloride, chlorhydric acid.

The chemical both the melting and boiling point is very dependent upon the concentration. But for normal room temperature conditions, hydrochloric acid remains a liquid.

Aqua regia is Latin for “regal water” or “royale water”.
It is a mixture of nitric acid and hydrochloric acid, by molar ratio 1:3 respectively.
This acid is able to dissolve gold and platinum.

Hydrochloric acid is not particularly regulated to any real extent. This means it is relatively safe or easy to just buy and possess this chemical without problems. Notice however that general bookkeeping, records and surveillance still applies. So purchases with credit cards will be documented in bank records.
What won’t happen, is that the purchase will be registered as suspicious. Or require some special license.

Hydrochloric acid can be increased in concentration with distillation or just simply boiling it, a bit.

Ways of synthesizing hydrochloric acid:

1 Sodium Bisulfate and Sodium Chloride Method:[26]

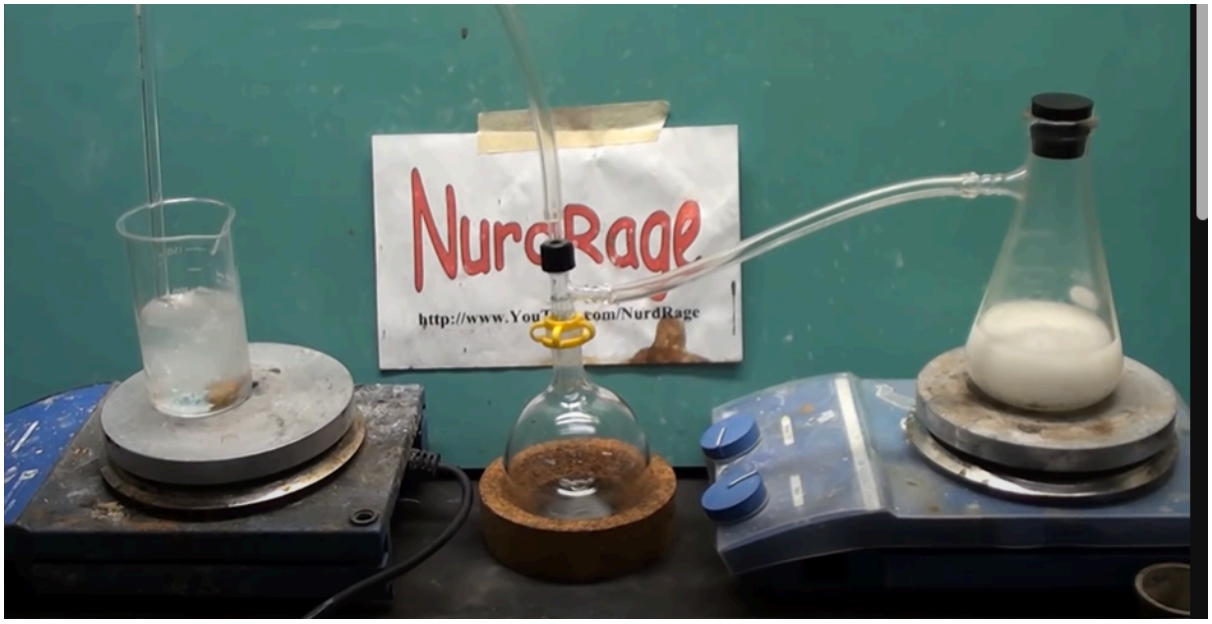
$NaHSO_4 + NaCl$ (+energy) → $Na_2SO_4 + HCl$

This reaction requires that the salts are heated up to work.

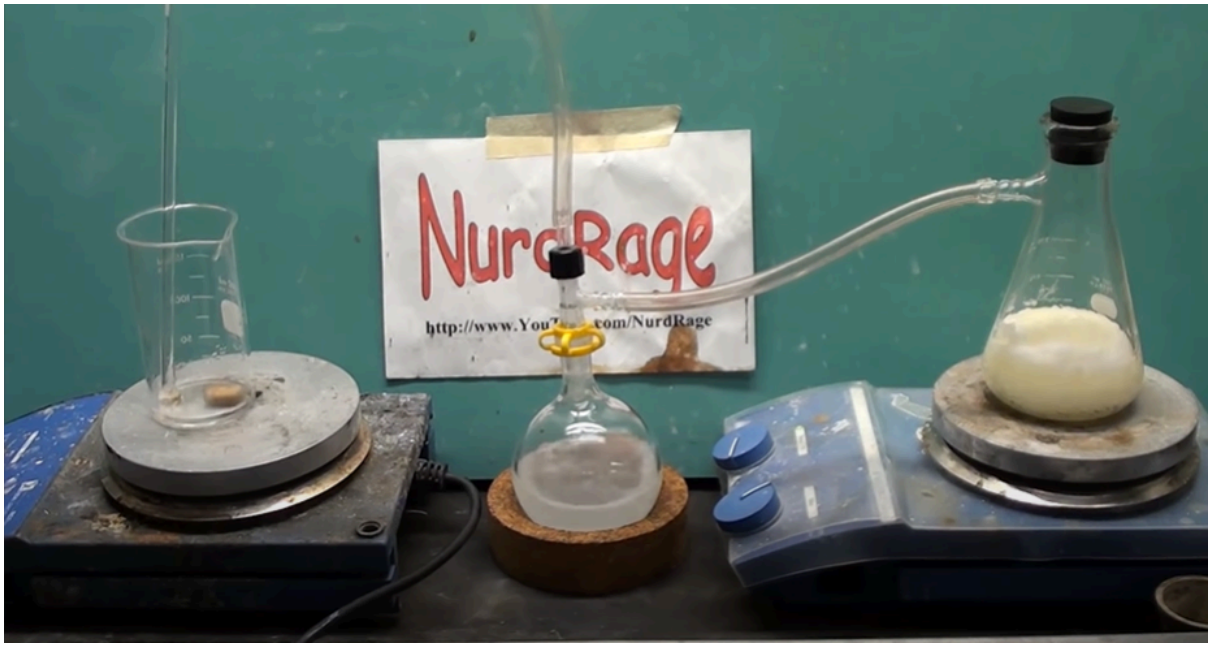
For this reaction, there’s a risk of backflow. Meaning that liquids may travel through the system due to pressure change. This may risk ruining the product or at least diluting it, by having the hydrochloric acid backflow into the beaker with sodium sulfate, mixing them when we want them separated.

[26] “Make Hydrochloric Acid”, NurdRage, 2 Oct 2010 https://www.youtube.com/watch?v=YGjd7xxTuZw

(beaker 1 is the right beaker, beaker 2 is the middle beaker, beaker 3 is the left beaker)
Before and during reaction



After reaction and backflow



Notice: in image 1 that the liquid is between the gas in beaker 1 and the air outside the system. This is when backflow may happen

Notice: in image 2 once the reaction is complete, it's fine if backflow happens because it is caught in beaker 2. Once it is pulled into beaker 2, a new pathway opens up for the gas in beaker 1 with the air outside the system. There is no water between the gas in beaker 1 and air outside the system. So the gas is no longer pulling the water.

This was dealt by having a set up of three beakers, not just two. Between beaker 1 and 2, similarly between 2 and 3, are air pathways for the hydrogen chloride gas. Beaker 1 is where the salts react to form the gas. The gas travels through the system, passing beaker 2, which is empty, to beaker 3. Beaker 3 has ice cold water, or ice and water mix, which the gas is pushed through. The water in beaker 3 will absorb the hydrogen chloride and make a hydrogen chloride solution, aka hydrochloric acid.
Notice now that, were there to be backflow and the water or hydrochloric acid was to travel backwards through the tubbing, then it would fall into beaker 2.

All and all make sure to have enough volume such that a potential change in pressure doesn't suck the hydrochloric acid or water through the entire system.
Make sure that based on liquids flow that gravitation would not allow the liquids to go from beaker 2 to beaker 1.

Instructions
Mix sodium bisulfate and sodium chloride heavily, with a small amount of water. Then add it to the first beaker.

Heat up the salt mixture and let the gas form and be carried over to the water in beaker 3.

Eventually the reaction will be complete and hydrogen chloride gas will stop being generated. On the other hand the water-hydrochloric acid may still backflow. If it does then it should fall into beaker 2, opening up the airway between beaker 1 and the outside of the system. Which means that the liquid does not continue to backflow.

The first beaker will be connected to a second beaker that is empty

2 Sulfuric Acid and Sodium Chloride Method:

$H_2SO_4 + 2\ NaCl \rightarrow Na_2SO_4 + 2\ HCl$

This method is done exactly the same as the sodium bisulfate and sodium chloride method. The only difference is that sulfuric acid is used instead of sodium bisulfate. and possibly that not as much heating is needed.

3 Chlorine gas and water Method:

$Cl_2 + H_2O \rightarrow HCl + HOCl$

This is done by simply passing chlorine gas through water.

$2\ HOCl\ (aq) \rightarrow 2\ HCl\ (aq) + O_2$

“Dilute aqueous solutions of hypochlorous acid are colorless , while concentrated solutions are yellow. They possess a peculiar odor, which differs from that of chlorine, and decompose slowly in the dark, more quickly in diffuse daylight, and very rapidly in sunlight or in the presence of catalysts such as oxides of cobalt, nickel, or copper. The main reaction is:

$2HOCl(aq) \rightarrow 2HCl\ (aq) + O_2;$ $\Delta H = -92.5\ kJ\ mol^{-1}$

yielding hydrochloric acid and oxygen[67].”[27]

Meaning hydrochloric acid can be made by:
Passing chlorine gas through water and then letting the solution sit in natural sunlight.
Or
Passing chlorine gas through water with the presence of catalysts such as oxides of cobalt, nickel or copper.

Chlorine gas can be made using hydrochloric acid; bleach and hydrochloric acid, potassium permanganate and hydrochloric acid, trichloroisocyanuric acid (TCCA) and hydrochloric acid, etc

Chlorine gas can also be synthesized by the decomposition of sodium chloride:
$2\ NaCl\ (+energy) \rightarrow 2\ Na + Cl_2$
Basically just heat sodium chloride to the point of decomposition, chlorine gas fumes will appear and sodium will be left as a liquid, which hardens when cooling down. Be careful sodium reacts with water and causes fire. $2\ Na + 2\ H_2O \rightarrow 2\ NaOH + H_2$
So one could heat up sodium chloride to extract chlorine gas, then throw the sodium in water, to get sodium hydroxide.

Chlorine gas can also be synthesized with electrolysis of sodium chloride in water:
$2\ NaCl\ (or\ KCl) + 2\ H_2O\ (+\ energy) \rightarrow Cl_2 + H_2 + 2\ NaOH\ (or\ KOH)$
[how do you extract sodium hydroxide from water?]

[27] “Inorganic Chemistry”, Holleman-Wiberg, 2001, page 442
“https://books.google.se/books?redir_esc=y&hl=sv&id=Mtth5g59dEIC&q=hypochlorous+acid#v=snippet&q=hypochlorous%20acid&f=false

Simplified process:
1 electrolysis of sodium chloride solution, makes chlorine gas and sodium hydroxide
2 the chlorine gas is passed through a layer of water, making hydrochloric acid and hypochlorous acid
3 The water-acid solution is placed in natural sunlight/daylight, which decomposes the hypochlorous acid to even more hydrochloric acid.

Meaning we can set up the following process:

Water and sodium chloride (table salt) are mixed, then undergo electrolysis in a partitioned cell, in a manner where the gasses that form are collected (don't leak out basically). The gasses formed are chlorine gas and hydrogen gas.

The remaining product salt is sodium hydroxide, which is useful and should be saved and stored.

Then the gasses are pushed/sucked through a layer of water. The chlorine gas will react with the water to make hydrochloric acid and hypochlorous acid. If catalyst oxides of copper, nickel or cobalt are present then the hypochlorous acid will decompose into hydrochloric acid and oxygen.

Notice: the hydrogen gas will not react with the water instead passes through it. Hydrogen gas combined with oxygen is explosive, be careful. Also some oxygen will be present from the air and possibly from some decomposition of the hypochlorous acid.

The hydrogen is then pushed/sucked to a chamber with oxygen where it can explode, making water.
$2\ H_2 + O_2$ (+ energy) $\rightarrow 2\ H_2O$
This can be done with regular air. Meaning the hydrogen (and air) is pumped into a chamber with regular air, and a flame which makes the water vapor.

This water can then be supplied back into the system. 1 into the NaCl solution for electrolysis. or. 2 into the water layer that collects the chlorine gas.

If no catalysts were used, once the reaction is complete, take the acid-water mixture and place it in natural sunlight. This allows the hypochlorous acid to decompose into hydrochloric acid.
Then an essentially pure hydrochloric acid solution is generated.

Acetic Acid

Also called vinegar.

For simple reactions like making acetates store vinegar, dilute acetic acid may be sufficient.
But for most larger reactions you should use glacial acetic acid, meaning pure acetic acid.

Glacial acetic acid:

Dilute acetic acid reacts with sodium salts to make sodium acetate.
The sodium acetate can be dried in an oven to make anhydrous sodium acetate. This is done at 120-150°C between 2-4 hours.

Anhydrous sodium acetate reacts with acids to produce acetic acid.

So react anhydrous sodium acetate with pure sulfuric acid, hydrochloric acid or nitric acid, in a distillation station, heat to 118.1°C and distill over the acetic acid.

It is important that the sodium acetate is anhydrous, so that no water distills over as well.

So basically: mix anhydrous sodium acetate with pure sulfuric acid, heat to 118.1°C and distill over pure acetic acid.

This produces glacial acetic acid.

And the reaction works with calcium, calcium salts, potassium salts, etc, which also become acetates reacting with acetic acid, they can also be dried, and then reacted with an acid to make pure acetic acid, which is distilled over at 118°C.

Acetic Anhydride

Acetic anhydride is generally a very dangerous thing to try and produce and the products fumes are dangerous. This needs to be performed using air thigh equipment and good ventilation and fume hoods.

This chemical is not available to the public as it is used to produce heroin.

The methods of synthesis are:

Acetic Acid, Sodium Bicarbonate, Sulfur Chloride Method:[28]

This method uses sulfur chloride which is prepared by the following:

It is produced by partial chlorination of elemental sulfur. The reaction proceeds at usable rates at room temperature. In the laboratory, chlorine gas is led into a flask containing elemental sulfur. As disulfur dichloride is formed, the contents become a golden yellow liquid:

$S8 + 4\ Cl2 \rightarrow 4\ S2Cl2,\ \Delta H = -58.2\ kJ/mol$

Excess chlorine produces sulfur dichloride, which causes the liquid to become less yellow and more orange-red:

$S2Cl2 + Cl2 \rightleftharpoons 2\ SCl2,\ \Delta H = -40.6\ kJ/mol$

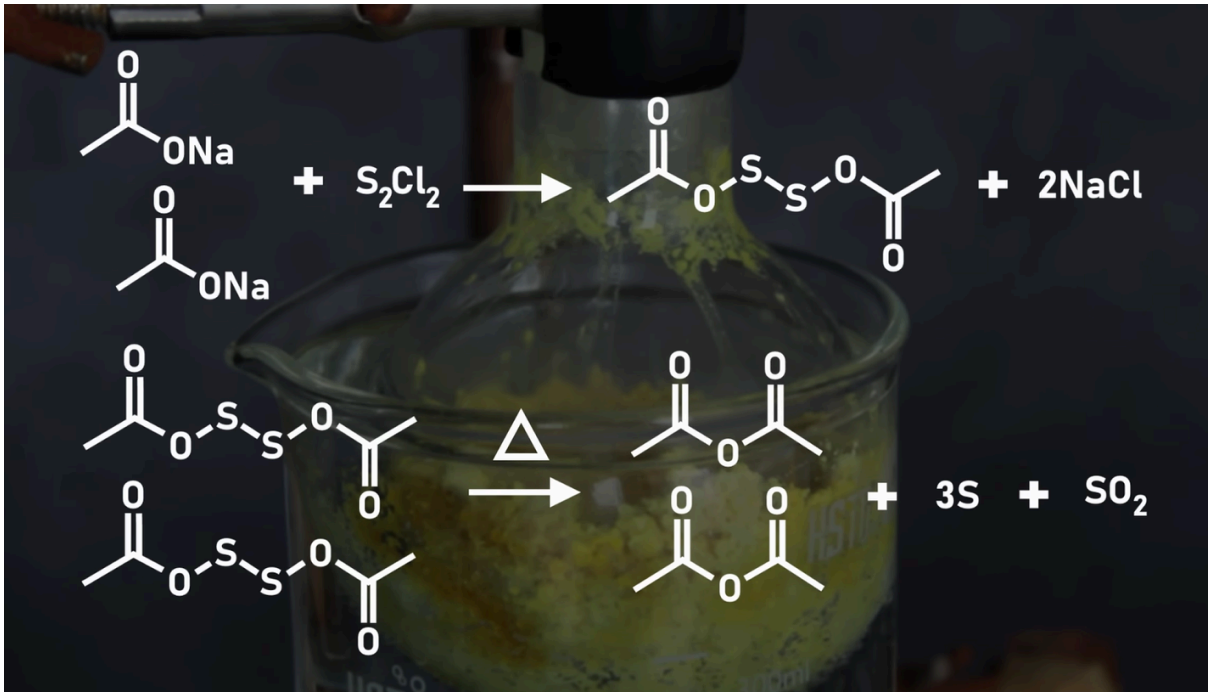
So basically add chlorine gas to sulfur until it becomes a golden yellow liquid. And then stop.

[28] "Acetic Anhydride from Vinegar: The Sulfur Chloride Route | OTC Acetic Anhydride Synthesis", LabCoatz, 2 Jan 2023 https://www.youtube.com/watch?v=OrZ5Oa9K1R0

Sodium acetate is prepared by the following:
$CH_3COOH + NaHCO_3 \rightarrow CH_3COONa + CO_2 + H_2O$

1 Fill a beaker with acetic acid.
2 Slowly add sodium bicarbonate. Stirr while adding, or have an automatic stirring bar on. Add slowly to avoid a runaway reaction. The runaway reaction is not dangerous but will spew sodium acetate out of the beaker.
3 When all the sodium bicarbonate has been carefully added, keep mixing, and bring the solution to a boil. This will boil off the water. Leaving behind sodium acetate.
When the mixture becomes more thick in texture remove the stirring bar to stirr manually by hand.
4 Once powdery and dry it could still contain some water, and water is problematic for the other reactions.
Anhydrous sodium acetate can be achieved by melting the sodium acetate.
Melting sodium acetate can be done with a blow torch and hot plate.
Don't melt the sodium acetate too quickly, rapid heating can cause decomposition of sodium acetate.
As soon as the sodium acetate has been melted the removal of water is complete. Which means no more heat is needed.
5 Let the anhydrous sodium acetate cool down, and stirr while doing so to avoid the formation of one large cake or large chunks.
Let the sodium acetate fully cool down before proceeding.

Lastly you prepare Acetic Anhydride by the following:



1 Prepare a round bottom flask in an ice bath.
2 Add the sodium acetate to the round bottom flask.
3 Add the sulfur chloride to the round bottom flask, and stirr heavily with a glass rod once everything is added.
4 Add a reflux condenser to the round bottom flask.
5 Remove the ice bath and replace it with a water bath on top of a hot plate.
6 Heat the water bath to a boil. This will be hot enough for the reaction to take place where acetic anhydride is produced, but not hot enough to melt the sulfur on the glass.
7 Let the reaction reflux for 2 hours.
8 Let the mixture then cooldown.

Extraction of acetic anhydride:
1 Remove the reflux condenser and the water bath.
2 Place the round bottom flask on a hot plate, and prepare a new empty round bottom flask in an ice bath. And prepare a distillation station by connecting the two.
3 Add aluminum foil around the round bottom flask containing the acetic anhydride, and turn on the heat.
4 The first distillate will be mostly acetic anhydride, but it is still contaminated by some sulfur and acetic acid products. To purify this further:
Prepare a new distillation station where the flask of impure acetic anhydride is placed on a hotplate.
5 Heat the mixture around 127 degrees celsius. Keep the temperature there for some time. The first distillate will be mostly acetic acid and sulfur contaminants.
Once distillation appears to stop, that's when you remove and discard the distillate.
The remaining fraction which is higher in boiling point is essentially pure acetic anhydride.

The boiling point of acetic anhydride is 139.8 degrees celsius, so make sure to keep the temperature around 127 or under 130 degrees celsius. To distill out the impurities.
To help further destroy contaminates, add a small amount of potassium permanganate before distilling to begin with.

To test if what remains is acetic anhydride:
It should be a colorless liquid.
Flammable.
When ignited should have an orange flame.
It should be acetic, which is tested with pH or indicators.

Acetone Thermolysis:

This method is quite dangerous and involves producing ethenone and methane which are very explosive. This is definitely performed on a small scale before attempting anything larger.

The Schmidlin ketene synthesis involves thermolysis of acetone which takes place around 600-700°C:
$CH3COCH3 \rightarrow CH2=C=O + CH4$
This thermal decomposition of acetone produces ethenone (CH2=C=O, also called ketene), and it produces methane (CH4).

The idea is to pass the ethenone-methane gas through acetic acid. The ethenone (ketene) will react with acetic acid and become acetic anhydride. Meanwhile the methane will pass through.
This is called the ketene process.
Dilute acetic acid, meaning not pure acetic acid should work. But if it doesn't work try a higher concentration acetic acid or glacial acetic acid.

In theory one could add a complex system to convert the methane into something very useful like nitromethane.
Though this is very hard. I recommend storing the methane in a tank or something. The gas itself can explode and can be incorporated into a bomb.
Otherwise the simplest and safest alternative is doing this operation outside and simply releasing the methane into the air.

If you are inclined to try and utilize the methane as well and have good resources and are familiar with the procedure you could attempt:
Pass the methane into a see-through tank with chlorine gas, if you use glass, have a stand-off distance from it just in case.
Do it outside and/or with help of uv light, shine on the gasses, and then heat the gasses to 400-500°C.
This will cause the following reaction:

$CH_4 + Cl_2 \rightarrow CH_3Cl + HCl$ (uv light and 400-500°C)
Once the reaction is complete, let it cool down, the hydrogen chloride (HCl) will become liquid, meanwhile the chloromethane (CH_3Cl) remains gas.
Then let the chloromethane gas pass through acetone which will absorb it. Leaving hydrogen chloride liquid left in the tank which can be collected.
Lastly add silver nitrite ($AgNO_2$) to the chloromethane-acetone mixture, and dissolve the silver nitrite, and it will eventually react and make nitromethane and silver chloride.

To extract the nitromethane:

The silver chloride will precipitate out, and you filter this out using gravitational filter or vacuum filter.

Then the resulting acetone-nitromethane mixture is heated to 56 degrees celsius, which is the boiling point of acetone. And you distill over the acetone.

Leaving you with essentially pure nitromethane.

Silver nitrite is usually made industrially by:

$AgNO3 + NaNO2 \rightarrow AgNO2 + NaNO3$

And silver nitrate (AgNO3) could be made from the silver chloride you've made, you nitrate it with nitric acid.

And the resulting chlorine gas from nitrating silver chloride with nitric acid can be used.

You simply let the chlorine gas into the gas tank you intend for methane.

Potassium Chlorate

Potassium chlorate can be made by electrolysis of either chlorides, hypochlorites or chlorites. But that is further explained in the section for chlorates, in "Synthesis and Applicability of Explosives".

Potassium chlorate is found in match heads.
To extract only the potassium chlorate, firstly crush the match heads over a paper. Then grind it down into a fine powder. After that, mix it with hot water and let it dissolve.
Depending on the temperature of the water, the amount of grams able to be dissolved per 100 ml water is:
3.13 g/ 100ml (0 degrees celsius)
4.46 g/ 100ml (10 c)
8.15 g/ 100ml (25 c)
13.21 g/ 100ml (40 c)

Once dissolved, filter it through a coffee filter. The filter will collect the impurities and leave pure potassium chlorate and water mix liquid.

Then pour the liquid over some flat surface with borders, so that the water can evaporate, and the potassium chlorate can crystalize.

Lastly break the crystal into fine powder. This can be done by placing into a very dense sieve and scraping the potassium chlorate until it passes through. Or by milling it.
Notice that it's fine to mill potassium chlorate and red phosphorus INDIVIDUALLY. But it should NEVER be done after they have been mixed with each other.

Notice also: Potassium chlorate can be used to prepare Armstrong's mixture. And there are two methods of doing so: the dry method, simply mixing the powders, or, the wet method, which is mixing the powders in water, and later let the mixture dry in the setting you intend like a bomb.
When doing the Dry/Powder Method: it is important that the potassium chlorate is allowed to fully dry. This is to avoid exposing red phosphorus to water when mixing it with potassium chlorate. To avoid any acids formed from oxidizing phosphorus.
When doing the Wet/Liquid Method, these acids are neutralized by the calcium carbonate.

Red Phosphorus

Red phosphorus can be found on the side of match packets, where the match heads are stricken against. It is collected by simply scraping off it from the strip, with something like a razor blade, avoiding scraping off any of the cardboard.

Glycerol

Glycerol, sometimes called glycerine, can be bought but is also easily made at home.
Glycerol is obtained typically through a reaction between animal fat and sodium hydroxide solution.
Triglyceride (Fat) + 3 NaOH + H_2O → 3 Soap + 3 Glycerol
Here's a simple guide how to conduct the reaction:
https://www.wikihow.com/Make-Glycerin

Basically cut the animal fat into small pieces, place it in a pot, add water, and cook for 30 min, melting it. Remember to stir.

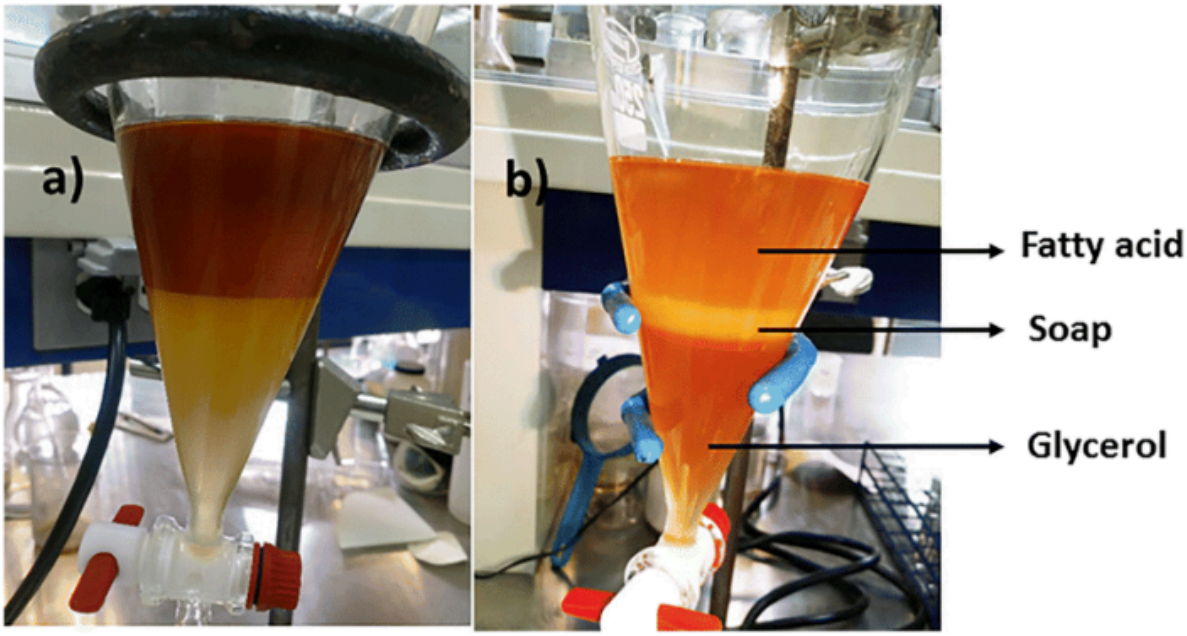
Sieve the fat.

Bring the fat to 45°C, and add the lye solution.
Remember to stir simultaneously.

While stirring you notice it becomes "soapified", then add the salt.

Let it cool and skim off the soap, and collect the glycerine.

If you have trouble separating the soap and glycerine:



Gravitational separation of fatty acid and glycerol with (a) sulphuric acid and (b) citric acid

Citric acid is fitting for separating glycerol from soap, and glycerol can then be filtered with gravitation

Basically:
1 If the soap and glycerol separate naturally, just use a spoon and collect each. The soap is the harder and thicker substance viscosity wise, often white
2 If they don't separate, add citric acid, and use gravitational separation. The glycerol will be at the bottom.
3 If they don't separate, add sodium chloride, and use a gravitational filter. The liquid is a mix between glycerol and water, the solid in the filter is soap and sodium chloride.

Ethanol

One can try and buy industrial grade ethanol, or try to extract it from things like liqueur or hand sanitizer. One could even set up a fermentation operation and then distillation for absolute alcohol.

I highly recommend extracting ethanol from hand sanitizer by simple distillation.
Ethanol has a boiling point of 78°C. Which is the temperature you should heat the hand sanitizer to. And then let the ethanol distill over.
Remember to read on the hand sanitizer label what percentage of the mixture is ethanol, and how much you expect to distill over.

Methanol

One can probably buy methanol. Otherwise like ethanol, there's probably a lot of products with the alcohol, and it can simply be distilled out.

Windshield washer fluid: 50% methanol 50% water, sometimes dye is added for color. But this varies a lot, check MSDS (Material Safety Data Sheet) to verify how much methanol can be extracted.
The best way to extract it is by distillation.
Methanol has a boiling point of 64.7°C. So simply heat the mixture and distill over the methanol.

If so inclined one could even extract methanol or "wood alcohol" from trees:

When making wood alcohol, wear protective clothing like masks, gloves, and goggles. Prepare wood alcohol outdoors or in a well-ventilated area. As you ensure your safety, you may proceed to the steps below.

- Place a covered large pot over heat to initiate the distillation process. In this step, you need to use a thermometer to track the temperature of the wood and the water mixture.
- Create a hole in the lid of your pot similar to the diameter of the condenser tube, a metal tube that the alcohol will pass through as it evaporates. Thus, this tube shall be connected to the lid of the pot.
- The other end of the condenser tube should be attached to the lid of an additional pot. This will be your holding container. This container is kept covered all the time to prevent the evaporation of alcohol.
- Place the wood chips in the pot and fill this with water. Heat it until you reach temperatures of 78.3 degrees Celsius. Use your thermometer to keep this at this level. Wood will ultimately break down and release alcohol into the condenser. It will slowly drip down into the holding container. You may distill the finished product again to improve its purity.

Place your wood shavings in to the pot and fill with water. Heat it until you reach 78.3 degrees Celsius and keep it at that temperature. As the wood breaks down, it will release alcohol into the condenser tube and slowly drip down into your holding container. You can distill the alcohol again to improve its purity.

Acetaldehyde

The boiling point of acetaldehyde is 20.2°C and so when making it you either need to cool it using ice baths around the glass tubing and/or bubble this into water.

Smaller quantities can be prepared by the partial oxidation of ethanol in an exothermic reaction. This process typically is conducted over a silver catalyst at about 500–650 °C.
$CH3CH2OH+12O2⟶CH3CHO+H2O$
This method is one of the oldest routes for the industrial preparation of acetaldehyde.

Traditionally, acetaldehyde was produced by the partial dehydrogenation of ethanol:
$CH_3CH_2OH \rightarrow CH_3CHO + H_2$
In this endothermic process, ethanol vapor is passed at 260–290°C over a copper-based catalyst. The process was once attractive because of the value of the hydrogen coproduct, but in modern times is not economically viable.

Basically you want to heat ethanol and pass it through a tube with copper filament, a bunsen burner can be used to keep the temperature right at the copper wire.
Notice again that acetaldehyde has a boiling point of 20.2°C, and so as it is being passed through the glass tube, you should at the end have a beaker of water to collect it.
Meaning you lead the acetaldehyde gas into water, which can then cool it ideally below 20°C.
Here's a video showing how to perform the operation:[29]
https://www.youtube.com/watch?v=KBy_cjnMjpo

Alternatively in theory bubbling ozone gas into ethanol should form acetaldehyde.
I suggest doing so in a distillation station, to distill over the acetaldehyde being formed, and cooling it into a liquid (or leading it into water).
If you don't distill over it, the acetaldehyde may react with the ozone to further oxidize into acetic acid.
Favoring acetaldehyde: low temperature, low ozone dose, acidic to neutral pH.
Favoring acetic acid: longer ozone exposure, slightly higher pH.

Formaldehyde

It is sometimes sold under the name formalin. Formalin is a mixture of water, methanol and formaldehyde. Approximately 37% by weight is formaldehyde and 10-15% is methanol.
Formaldehyde is easily oxidized by the oxygen in the air into formic acid. So it is common that commercially available formaldehyde is sometimes contaminated by formic acid.

Notice the boiling point of pure formaldehyde is -19°C, and so when making this yourself you want to bubble this gas into water, which it is soluble in.

One can make formaldehyde in a fashion slightly different from acetaldehyde:
One passes the methanol vapors in air over a hot platinum wire and then collects the formaldehyde gas in cold water.
So heat the platinum wire to around 600-700°C, in a glass tube.
Then heat methanol and let it with air pass through the platinum wire.

[29] "Preperation of ethanal (acetaldehyde) + Fehling's test", Astral Chemistry, 29 Dec 2016
https://www.youtube.com/watch?v=KBy_cjnMjpo

And then lead the end-product gas into cold water.

Formic acid

Formic acid could be bought, or made by reacting formaldehyde with oxygen, or the simplest and best method of making it yourself:
Mix oxalic acid and glycerol, both very easy to acquire, and then heat the mixture to 100-120°C.
This will produce carbon dioxide gas, and leave pure formic acid left.

When there's no more carbon dioxide gas being produced then that is a sign the reaction is complete.

Methane

As stated previously heating and decomposing acetone will create ethenone and methane. This takes place around 600-700°C. But in this reaction you need to separate the gasses which is best done by letting them pass through acetic acid, which will absorb the ethenone and not the methane. The ethenone then becomes acetic anhydride.

To generate only methane:
Mix sodium acetate and sodium hydroxide and heat to around 300-350°C. This will react and form methane gas, and leave solid sodium carbonate behind.
$CH_3COONa + NaOH \rightarrow CH_4 + Na_2CO_3$

Remember to use anhydrous sodium acetate and sodium hydroxide. You make these anhydrous, or pure, by heating them to dry off all the water.
The appropriate heat to dry these are 120-150°C, heat gently in the oven for example. Do this for two hours. And do not heat beyond 200°C which might cause decomposition.
Remember that sodium hydroxide is corrosive so use gloves.

Benzene

There are some products available on the market with benzene but these generally have very low concentration. Like fuel, gasoline is usually only 1% benzene, some have upwards of 5%.
So if you are planning to extract the many different chemicals in for example gasoline it might be worth it. I suggest when gasoline prices are low, if you are capable, to extract and separate the many different chemicals in fuel. One of which is the at best 5% benzene.
Otherwise it is not profitable to buy a bunch of gasoline to only extract and use at most 5%.

You could also try and buy pure benzene from chemical suppliers.

There are two methods worth mentioning for producing your own benzene. The first method is the more standard lab method, which involves the slightly hard to come-by sodium benzoate.
And then there's the second method, which is a harder procedure but only involves very prominent and easy to find material.

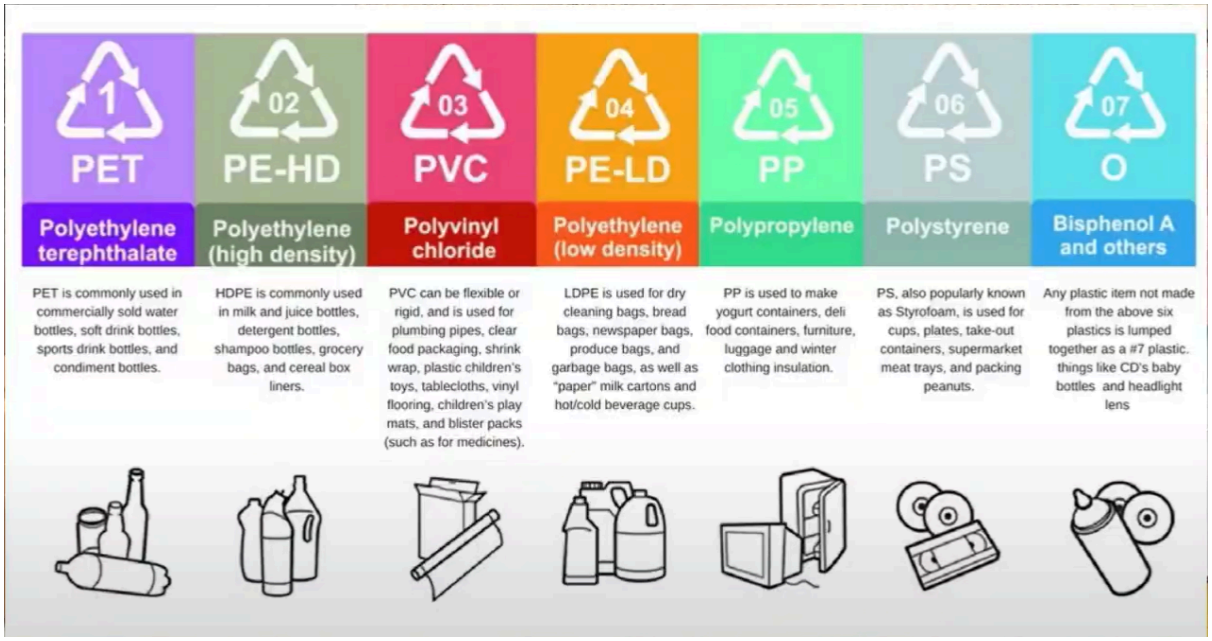
Sodium hydroxide and sodium benzoate method:

Very simply you mix sodium hydroxide and sodium benzoate. You then heat the mixture to 320-350°C. This produces benzene vapor which is distilled over and leaves sodium carbonate behind.

Sodium hydroxide, ethylene glycol and PET plastic method:[30]

This should be done in a well ventilated area and preferably using a fume hood, because there are potentially dangerous fumes.

First, identify PET plastic:


1
PET
Polyethylene terephthalate
PET is commonly used in commercially sold water bottles, soft drink bottles, sports drink bottles, and condiment bottles.
02
PE-HD
Polyethylene (high density)
HDPE is commonly used in milk and juice bottles, detergent bottles, shampoo bottles, grocery bags, and cereal box liners.
03
PVC
Polyvinyl chloride
PVC can be flexible or rigid, and is used for plumbing pipes, clear food packaging, shrink wrap, plastic children's toys, tablecloths, vinyl flooring, children's play mats, and blister packs (such as for medicines).
04
PE-LD
Polyethylene (low density)
LDPE is used for dry cleaning bags, bread bags, newspaper bags, produce bags, and garbage bags, as well as "paper" milk cartons and hot/cold beverage cups.
05
PP
Polypropylene
PP is used to make yogurt containers, deli food containers, furniture, luggage and winter clothing insulation.
06
PS
Polystyrene
PS, also popularly known as Styrofoam, is used for cups, plates, take-out containers, supermarket meat trays, and packing peanuts.
07
O
Bisphenol A and others
Any plastic item not made from the above six plastics is lumped together as a #7 plastic. things like CD's baby bottles and headlight lens

PET stands for “Polyethylene terephthalate” and it is marked by:
A recycling triangle, with the numeral one inside of it, and the text “PET” underneath.

[30] “Turning Plastic Waste into Benzene”, jam_kemist, 17 Feb 2024
https://www.youtube.com/watch?v=ipq9GRFq8Eo

PET is the most commonly used plastic and so most plastic products will have this mark.

Second, cut the plastic into small pieces:
Cut off and discard the lid portion.
Cut the rest into small pieces.
The smaller pieces can be thoroughly and quickly cut using an electric mixer.

Third, acquiring ethylene glycol:
Ethylene glycol is sold as an antifreeze.
Most often it is sold essentially pure with some blue color added.
Other times it is sold in mixtures with water and alcohol, and has a yellow color added.

It is best to consult the product data sheet to figure out the purity of a product.

If you have impure product contaminated with water and alcohol, simply set up a distillation station.
Ethylene glycol has a boiling point of 197.3°C, which is much higher than water's 100°C and alcohol's 78.23°C.
So heat the mixture to 100°C or slightly more and distill over the alcohol and water mixture.
What is left behind is pure ethylene glycol.

If you can’t find any information on the purity, you can also test the purity by heating it to 100°C or slightly more, if it boils there is most likely water and/or alcohol in it, which you can distill over.
If it doesn’t boil it is most likely not very seriously contaminated.

Fourth, dissolve sodium hydroxide in ethylene glycol:

The ethylene glycol will act as a solvent for the sodium hydroxide, but it also plays an important role in the reaction, so not any solvent could be used.

Simply add ethylene glycol to the sodium hydroxide and mix.
Everything doesn’t need to be perfectly dissolved but try as best as possible.

Dissolving sodium hydroxide in ethylene glycol can be a bit time consuming, so one alternative is to add them together and then have an automatic stirrer go for 10-15 min.

Fifth, set up a distillation station with a condenser, where the reactor is a metal container:
Have a metal container with a condenser which at the top is directed downwards to a beaker.

It is important that you use a metal container when melting sodium hydroxide, as molten sodium hydroxide could damage glassware.
Also make sure your setup is airtight.

Upon heating the reaction will take place and benzene will form, and due to the heat and benzene having a low boiling point it will evaporate.
The other product is sodium carbonate, and it has a much higher boiling and will not evaporate.
Meaning a distillation would have benzene as the first distillate.

The only problem might be that ethylene glycol also has a low boiling point. And so any unreacted ethylene glycol could evaporate along the benzene. This is solved by the condenser.
The condenser allows the mixture to heat to a point of reaction whereby nothing distills over, and once a lot of ethylene glycol has reacted, the temperature can go to its full.
This minimizes the unreacted ethylene glycol present once the heat allows for distillation of benzene and ethylene glycol.
So heat the mixture to where evaporation takes place, but nothing distills over, and let this be for some time, before turning the heat to its full.

Sixth, add all the ingredients to the metal container:

Add the PET plastic and sodium hydroxide dissolved in ethylene glycol to the metal container.

Seventh, heat the mixture to a point of evaporation and condensation, but no distillation:

Eighth, heat the mixture to about 300°C:

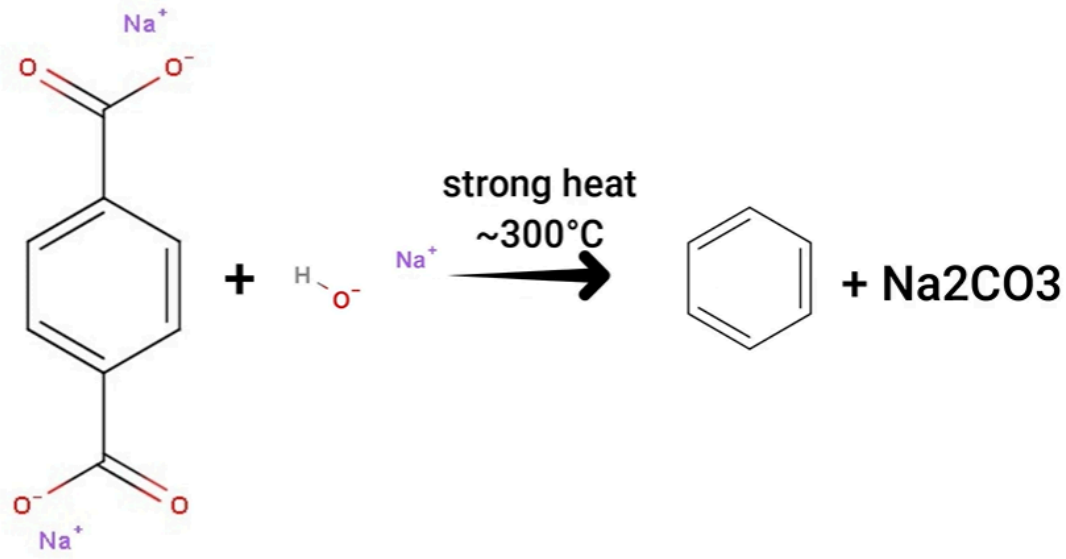
Notice, you should use a longer condenser if you heat the mixture to 300°C and fumes pour out. It should be like a normal distillation where it drops over slowly.
Basically the heat needs to be around 300°C for the reaction to take place, and the set up needs to be adjusted for that, so that it distills appropriately.

Notice also that these fumes are toxic, so if you see fumes escaping out instead of one liquid drop at a time, stop applying heat, and don’t breathe the fumes.

If you need to heat the mixture slightly more than 300°C that is fine.
The ca 300°C is needed for the reaction, and everything that distills under 300°C is probably mostly ethylene glycol.
But if your condenser setup requires some higher temperature than 300°C to start distilling that is fine.

The reaction itself is a decarboxylation of the terephthalic acid from the PET.

Meaning the terephthalic acid loses its two carbon dioxide groups and forms benzene.
And this is done by adding a base such as sodium hydroxide and heating strongly.
The carbon dioxide will also react with the sodium to produce sodium carbonate.



Ninth, collect the distillate.

Nitrobenzene

1 Benzene + 1 Nitric Acid + 2 Sulfuric Acid → 1 Nitrobenzene + 1 water
At 50-60 degrees celsius

Wash twice

Distill away the water, which needs to be disposed of safely because nitrobenzene is very toxic and any present in the water could be potentially dangerous.

Lastly add calcium chlorate to the nitrobenzene to remove the last water, then filter out the calcium chlorate.

Toluene

Toluene, sometimes called toluol, can be bought in hardware stores or prepared by the reaction:

Solid acid method:

Benzene and methanol in the presence of a solid acid catalyst.
Solid acid meaning: acid that is insoluble in the reaction medium.
A good alternatives of solid acid catalyst for this reaction are; silica-alumina (SiO_2-Al_2O_3) or montmorillonite K10 clay.
Silica alumina can be bought by chemical suppliers. And montmorillonite K10 clay can be bought in some pottery stores.
The reaction is:
C6H6 + CH3OH → C6H5CH3 + H2O (with solid acid catalyst).
The reaction is carried out at 350-450 degrees celsius. And not above 500 degrees celsius.
Meaning this is done is gas phase.

So all and all, one method of making your own toluene is:
Mixing benzene and methanol, and then heat the mixture into vapors 100 degrees celsius is enough.
Let the vapors pass through a glass tube with the solid acid (silica-alumina or montmorillonite K10 clay.
The solid acid part should have a bunsen burner beneath it, heating it to 350-450 degrees celsius.
And then like distillation the end product toluene is obtained in a beaker at the end.

Notice no water is needed as toluene is naturally a liquid when cooled. Though having a system to cool the resulting toluene before reaching the beaker helps ensure it turns to liquid.
The best thing is to have the system be air tight at the end ensuring the toluene is trapped and has time to cool down.

Chloromethane method:

Using pure anhydrous benzene (no water). Placing the benzene in a beaker. And then placing that beaker on an ice bath. And keeping the temperature below 25 degrees celsius at all times.
Then slowly add aluminium chloride (AlCl3) to the benzene. Keep a watch on the temperature.
Then you bubble chloromethane into the mixture. Again watch the temperature.
Lastly adding HCl to the mixture at the end helps remove unreacted aluminium chloride.
Toluene and hydrochloric acid vapors will be produced. Let the HCl gas vapor off or distill it over.
Finally you distill over the toluene. Do this when no more HCl is being produced, meaning the reaction is complete and you can replace the HCl distillate beaker with an empty one for the toluene.

Chloromethane is easily made by mixing methanol and hydrochloric acid, and then heating the mixture to 100-150 degrees celsius.
But it is very important to have a condenser for this reaction. A condenser will allow reactants that vapor off upon heating to cool down and fall back into the reaction.
And the resulting chloromethane is naturally a gas and should either be collected as gas or directly lead into its next reaction.
Meaning it is immediately bubbled into the benzene-aluminium chloride ($AlCl_3$) mixture.
Notice the gas is warm so being able to control the gas flow is ideal.

This second method uses aluminium chloride which reacts with water so again no water can be present.

All and all the simplest is being able to buy toluene. But if you cannot or find it possible to make it yourself you can.
The reactants are easily attainable though the procedure is technical.
Again you either:
1 Heat benzene and methanol together and pass it through a heated solid acid catalyst, and collect the toluene being distilled over.
Or
2 Put benzene on an ice bath, and slowly add aluminium chloride. Then set up a flask with methanol and hydrochloric acid with condenser, heat the mixture and lead the resulting chloromethane into the benzene mixture. Let the resulting gas (HCl) distill over. Once the reaction is complete replace the distillate beaker. And distill over the toluene.

Phenol

Unlike toluene, phenol is not available to be bought in many hardware stores. But there are some methods to make it that are not too difficult.

Chlorobenzene-sodium hydroxide method:

Chlorobenzene and sodium hydroxide (and hydrochloric acid) react to produce phenol and sodium chloride.
This reaction is carried out around 350 degrees celsius.
This involves melting sodium hydroxide and thus glassware should not be used. Glass doesn't handle molten sodium hydroxide well.
Instead use metal containers.
This reaction takes between 1-3 hours.
The reaction first makes sodium phenoxide and to help convert this into phenol you can add dilute HCl.

To improve yield one can:
1 increase the pressure to 200-300 atm.
2 use catalysts like aluminium chloride or copper chloride.
3 Using a large excess of sodium hydroxide flakes.

Full procedure:

$C_6H_5Cl + NaOH\ (molten) \rightarrow C_6H_5ONa + NaCl \quad (350°C)$
$C_6H_5ONa + HCl \rightarrow C_6H_5OH + NaCl$
(This reaction is helped by using excess sodium hydroxide, meaning use 3-5 moles per mole of chlorobenzene).
(Dilute HCl works well for this reaction, but remember to calculate such that there's sufficient HCl moles to acidify the reaction. Meaning the volume of the actual HCl in the dilute HCl corresponds to enough moles for the expected sodium phenoxide moles, that ratio being 1:1.)

1 Add sodium hydroxide to a metal container and heat it to 350°C, and wait until it is molten.
2 Slowly add chlorobenzene. And stir with a metal rodd.
(Do this preferably outside or in a place with good ventilation, as fumes are generated).
3 Let this react for 3 hours. Stir yourself or have an automatic metal rod stirring.
4 Maintain the temperature of 350°C for the full 3 hours, with stirring. And then let the reaction cool down.
5 Let the reaction cool down for 15-30 min. To reach the ideal temperature just under 100°C.
6 When the mixture is just under 100°C, you start slowly adding small portions of water while stirring. (it is useful if the container has extra space for this).
7 Keep adding water and stir until the mixture is dissolved.
8 Once it is dissolved slowly add the dilute (10-20%) HCl.
9 Keep stirring for 10 min. You will see the phenol precipitate out of the reaction forming its own "oily" layer.
(if you test the Ph of the reaction and it is still basic, you should keep adding HCl until it becomes clearly acidic) (otherwise there's still unreacted sodium phenoxide)

10 Extraction of phenol. There's three ways to do this and these can be used in combination if feasible.
If there's a clear phenol layer, you can decant it.
If there's many clear layers, then a separatory funnel is feasible.
Lastly if there's unclear layers, or to remove excess water, you can distill the phenol out. The boiling point of phenol is 181.7°C, and so that is the temperature at which you expect to distill phenol. Any distillate prior to reaching 180°C is likely water.

To prepare your own chlorobenzene and hydrochloric acid:

$C_6H_6 + Cl_2 \rightarrow C_6H_5Cl + HCl$ (50-60°C) (keep it well below 80°C as not to boil the benzene)
With iron(III) chloride ($FeCl_3$) or aluminium chloride ($AlCl_3$) as catalyst.
Generally the catalyst molar ratio is 5-10% that of the benzene.
Again using a catalyst like aluminium chloride means no water should be present.

Full procedure:
1 Prepare a flask of benzene and aluminium chloride. With a distillation station for the HCl gas which will form. And opening into the flask from which chlorine gas can be bubbled straight into the benzene, preferably some glaspipe.
2 Heat the mixture to 50-60°C. And then bubble the chlorine gas into the benzene.
3 Chlorobenzene will form as liquid while HCl gas will be generated and distilled over to its own beaker. (high concentration HCl should boil and distill at under 50°C. But if you notice that there's not much distilling that's fine. You can let the reaction finish. So there's no benzene left. And then distill the HCl from the chlorobenzene. The HCl will have a boiling point below that of the chlorobenzene which has 131°C)

Aspirin method:

Aspirin tablets containing mostly acetylsalicylic acid ($C_9H_8O_4$) can be used to make phenol.
To verify that you have achieved phenol you can place a few drops on a test plate, and then add a few drops of $FeCl_3$, if phenol is present, you will get a violet-purple color.
You can also smell it as phenol has a distinctive, sweet antiseptic odor.

The first reaction is:
$C_9H_8O_4$ (aspirin) + $H_2O \rightarrow C_7H_6O_3$ (salicylic acid) + CH_3COOH (acetic acid)

Then:
$C_7H_6O_3$ (salicylic acid) $\rightarrow C_6H_5OH$ (phenol) + CO_2 (200-230°C)

Full procedure:
1 Crush up aspirin tablets and place them in water.
2 Add a few drops of NaOH (0.1 mol per mol aspirin).
3 Heat gently to 60-80°C for 15-30 min while stirring.
4 Let the solution cool.
5 Add dilute HCl to neutralize the NaOH (1:1 molar ratio).
6 Let the salicylic acid precipitate.
7 Heat the mixture to 100°C and boil off the water. Until you have dry salicylic acid.
8 Heat the dry salicylic acid to 200-230°C. This will slowly degrade the salicylic acid to phenol and carbon dioxide. Let the carbon dioxide gas evaporate. And you are left with pure phenol.

Aniline

Aniline is hard to find on the market. Chemical suppliers are maybe the only option. Either you produce it on your own or you find a way to steal it.
To make your own aniline you need nitrobenzene. But there are some varied methods:

Iron-HCl method:

$C_6H_5NO_2 + 3\ Fe + 6\ HCL \rightarrow 6\ HCl + C_6H_5NH_2 + 3\ FeCl_2$
$6\ HCl + 6\ NaOH \rightarrow 6\ NaCl + 6\ H_2O$ (neutralizing the HCl)

1 Mix nitrobenzene, iron and dilute HCl
2 Heat gently under reflux. 60-70°C.
Reflux being a closed, heated and stirred system. Use a magnetic stir bar.
3 Cool the mixture and then add NaOH to neutralize the excess acid and precipitate aniline.
4 Ether or diethyl ether can be used to help separate the aniline and increase yield.
5 Distill off the water and then collect the aniline.

Tin-HCl method:

$C_6H_5NO_2 + 3\ Sn + 6\ HCl \rightarrow C_6H_5NH_2 + 3\ SnCl_2 + 2\ H_2O$

You can also use tin instead of iron in the previous reaction. It functions exactly the same.

Hydrogen gas and Catalyst method:

$C_6H_5NO_2 + 3\ H_2 \rightarrow C_6H_5NH_2 + 2\ H_2O$

1 Dissolve nitrobenzene in ethanol.
2 Add Pd/C or Pt/C catalyst (5-10% by weight)
3 Stir and bubble hydrogen gas into the mixture, under 40-60°C.
4 Filter off the catalyst after the reaction.
5 Distill off the ethanol.
Aniline has a boiling point of 184°C and ethanol has 78°C.

To make your own nitrobenzene:

$C_6H_6 + HNO_3 \rightarrow C_6H_5NO_2 + H_2O$

Basically you nitrate benzene with concentrated nitric acid, and you use concentrated sulfuric acid as well. Use 0.5 by volume sulfuric acid per nitric acid.

Because water is being produced the sulfuric acid helps dry the reaction.
Remember to keep the reaction cool with an ice bath. Keep it under 50°C at all times.

1 Prepare a beaker on an ice bath.
2 Add sulfuric acid, and then slowly nitric acid. Stir.
3 Slowly add benzene. Stir and keep the reaction cool.
4 Once everything is added, keep stirring for 15-30 min.

Extraction of nitrobenzene:
1 Add cold water and the nitrobenzene precipitates out as a pale yellow oil.
2 Collect it via a separatory funnel.
3 Wash with sodium carbonate (5% by weight) water solution. Do this if you aim to neutralize the acids.
4 Distill off any excess water to dry it.

Acetone

Acetone is easily found and bought on the market.
Acetone is found in nail polish removers. Pay attention to if it is pure acetone or oil-acetone mix.

Acetone is also not that hard to make yourself:

Calcium acetate method:

$(CH3COO)2Ca \rightarrow CH3COCH3 + CaCO3$

Thermally decomposing dry calcium acetate at 350-400°C produces acetone vapor which can be distilled over. It also leaves you with calcium carbonate that isn't distilled over.

Calcium acetate is easily made with calcium salts and vinegar.
Examples, slowly react:
Acetic acid and calcium hydroxide.
Acetic acid and calcium (from calcium supplements or egg shells).
Acetic acid and calcium chloride.
Acetic acid and calcium carbonate.

Ethylene Glycol

Ethylene glycol is found in anti-freeze.
Generally anti-freeze is 50/50 water and ethylene glycol. But there are also concentrated anti-freeze which is 95-100% ethylene glycol. Check the MSDS to verify the concentration, and its contents.
And ethylene glycol has a boiling point of 197.3°C. So it is very easy to boil off the water.

There's a method to make ethylene glycol as well:
Gas phase reaction between dimethyl oxalate and hydrogen gas over a copper catalyst, at 180-260°C.
$(CH3O)2C2O2 + 4\ H2 \rightarrow HOCH2CH2OH$ (ethylene glycol) + 2 CH3OH (methanol)

Basically heat dimethyl oxalate to its boiling point of 166°C. And pass it through a glass tube with copper wire catalyst. With hydrogen gas present.
The catalyst is heated to 180-260°C.
And distill over ethylene glycol and methanol.
Methanol has a lower boiling point than ethylene glycol. So when purifying the ethylene glycol you heat the mixture to 70°C and distill over the methanol.

Dimethyl Oxalate:
Is made by refluxing oxalic acid with methanol and sulfuric acid.
$(COOH)2 + 2\ CH3H\ (+ H2SO4) \rightarrow (COOCH3)2 + 2\ H20$ (65°C)
Notice that this reaction uses the temperature that is the boiling point of methanol.
So you need a condenser to allow the methanol to cool down and fall back into the reaction and not boil it off.
This reflux is held for 2-6 hours.

Another reaction to make ethylene glycol is:
$C2H4 + H2O \rightarrow HO\text{-}CH2\text{-}CH2\text{-}OH$
Reacting ethylene gas with water. And this can be done in two ways:
1 Gas phase reaction between, ethylene gas and water vapor over a silver and alumina catalyst. This is done at 250 degrees celsius.
2 Bubbling ethylene gas into a water and sulfuric acid mixture. This is done at 60-80 degrees celsius.

To prepare ethylene:
$C2H5OH\ (+ H2SO4) \rightarrow C2H4 + H2O$ (catalyst)
This reaction is done at 170 degrees celsius.

Basically mix ethanol and sulfuric acid, heat to 170 degrees celsius and reflux it. The temperature must be 170 degrees celsius, because at around 140 degrees celsius the reaction produces diethyl ether instead.
The resulting ethylene is a gas and thus should directly be pushed into its next reaction.

Propylene Glycol

There are also antifreeze variants with the main ingredient of propylene glycol.
These are also a 50/50 mixture, of propylene glycol and water, like the ethylene glycol variants.

One can also prepare propylene glycol:
For this reaction ideally you want elevated pressure around between 20-60 atms. But it does work without you might just expect weaker yield.

$C_3H_8O_3$ (l) + H_2 (g) → $C_3H_8O_2$ + H_2O (use catalyst like copper or nickel)
And this reaction is done around 180-220 degrees celsius.

Basically heat glycerol to 180-220 degrees celsius with a copper catalyst and bubble hydrogen gas into it.
And use increased pressure around 20-60 atms if possible.

Diethylene Glycol

Diethylene glycol, sometimes abbreviated DEG, is found in brake fluids, these are often called 3-DOT or 4-DOT brake fluids. Check the contents to be sure.
The diethylene glycol can be extracted by distillation, though notice the many other contents have boiling points in close proximity to that of diethylene glycol so make sure to check the contents first, to help understand when to expect to distill over the most pure diethylene glycol.
As it likely isn't the first thing being distilled over.

Diethyl Ether

Diethyl Ether is found in starting fluid with heptane. When extracting the diethyl ether you can extract the heptane also which is useful. You can even add the heptane to the fuel tank in the car.
These starting fluids are generally:
60-85% Diethyl ether.
5-15% Heptane.
10-20% Propellant gases.
5% Additives

Check the contents before so you know how much to expect to be produced, when extracting the diethyl ether and heptane.

Remember diethyl ether should be stored over sodium metal or sodium hydroxide to prevent the formation of peroxides.
And of course keep open flames away from diethyl ether and the extraction procedure as these components are very flammable.
And ideally keep the area well ventilated even when using air thigh distillation set up. Because you will replace the distillate flask to receive the heptane.

The reaction is a simple distillation.[31]
Diethyl ether has a boiling point of 34.6 degrees celsius.
Heptane has a boiling point of 98 degrees celsius.
But notice that usually it is “branched heptane” being used in starting fluids and these have a boiling point between 79-94 degrees celsius.
Meaning you should be prepared and already have swapped beakers when finished distilling over the diethyl ether.
In case it comes early.

You can also prepare diethyl ether:
2 C_2H_5OH (+ H_2SO_4) → C_2H_5-O-C_2H_5 + H_2O (catalyst)
This reaction is done with temperatures around 140 degrees celsius. If the temperature is well above 140 degrees celsius then ethylene (C_2H_4) will form instead.

Basically mix ethanol and sulfuric acid, heat to 140 degrees celcius and stir. Because of the elevated temperature you will be distilling over the diethyl ether and water.

So mix ethanol and sulfuric in a distillation set up, heat and reflux, and collect diethyl ether and water mix.
And again store diethyl ether over sodium hydroxide. Peroxides are dangerous and can be explosive and preventing their formation is ideal.

Urea

Urea can be bought pure from farming stores, gardening stores, fertilizer suppliers.

Diesel exhaust fluid is about 32.5% urea in deionized water.
Urea melts at 133°C, and so one can simply boil off the water from diesel exhaust fluid.
Notice that when urea melts it decomposes into ammonia and isocyanic acid. So keep the temperature at 100°C and don’t melt the urea.

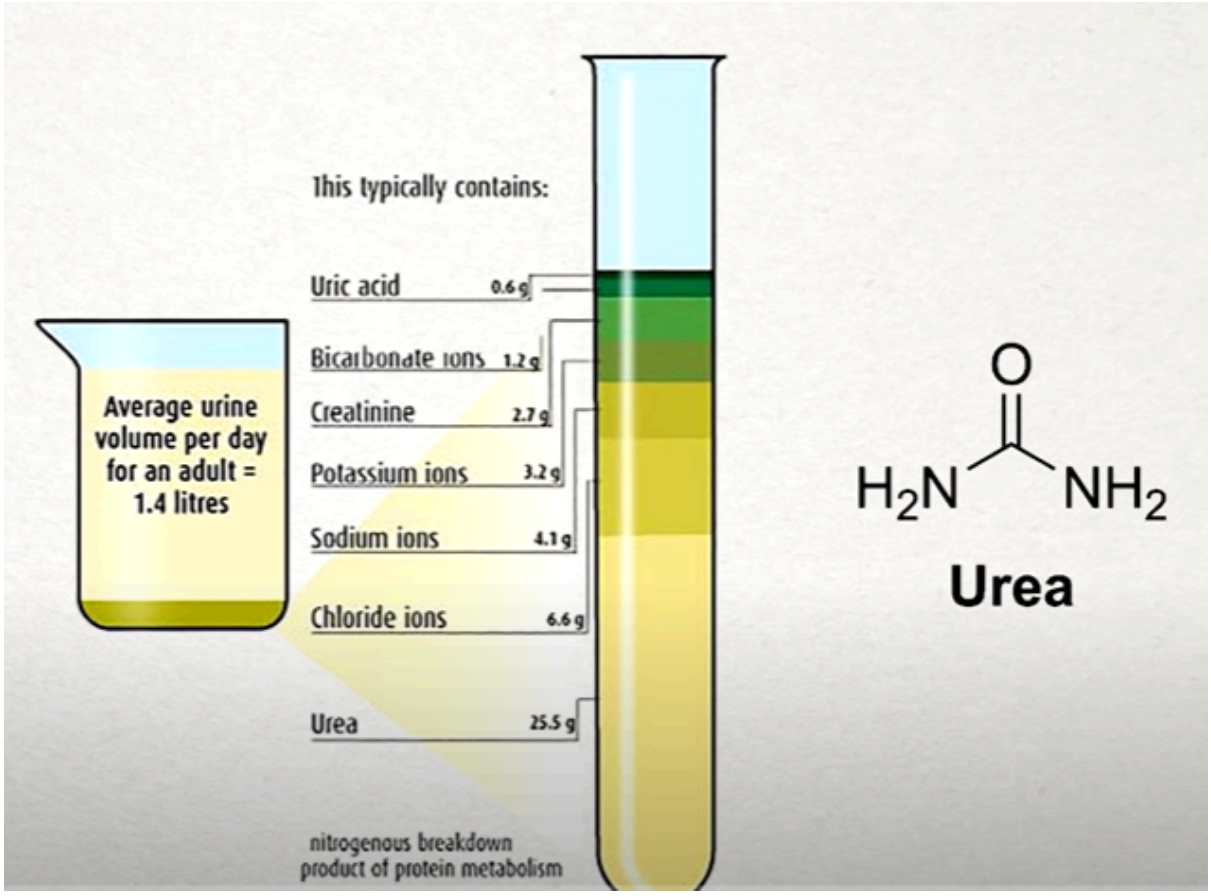
Certain skincare products are 40% urea. To extract it:
1 Add hot distilled water. (This will dissolve the urea in the water).
2 Filter through a paper or coffee filter to remove insoluble oils and waxes.

[31] “Diethyl Ether and Heptane from Starting Fluid | Obtaining Lab Solvents (episode 1)”, LabCoatz, 1 Jan 2022 https://www.youtube.com/watch?v=qmqBkr2MGi4

3 Add cold ethanol or acetone, this precipitates more insoluble oils and waxes which can be filtered off.
4 Filter again.
5 Gently heat and distill over the water and alcohol. Urea will crystalize as the water evaporates.

Lastly the urine of all mammals naturally contains urea. And this method is recommended if you have mammal animal stock like a farmer. You could easily extract a lot of urea from their urine.
But doing this will cause a disgusting smell and should be done outside.
It should also be noted it involves making the very useful explosive urea nitrate. Which is usually the end goal of acquiring urea in the first place for our intents and purposes.
So if you aim to make urea nitrate, then you naturally stop once you achieve pure urea nitrate by this process. And that is done around step 8.
But if you aim to use urea for other purposes and need pure urea then you do all the steps.

To extract urea from urine:[32]



1 Heat the urine and evaporate off almost all of the water. Ca 90%
Many precipitates will be produced, but the urea remains dissolved in the water.

[32] "Extracting urea from my own pee", NileRed, 3 Dec 2017 https://www.youtube.com/watch?v=sfldS5hqWYA

2 Vacuum filter the mixture. Discard the solid in the filter. Collect the liquid

3 Add concentrated nitric acid to the liquid. The reaction is exothermic and can get out of control.
So add in small portions and slowly.
The nitric acid added should be about ½ to ⅔ of the volume of the liquid.
Mix thoroughly.
This reaction produces urea nitrate, which will precipitate out.

4 Cool down the mixture and let it sit for several hours.
This is done to precipitate out as much urea nitrate as possible.
This can be done by placing the mixture in the refrigerator, but it should be noted: The mixture can still smell bad and a lot.
If one can't spare a refrigerator unit or wants to keep it outside at all times, one can:
Place the mixture and its vessel in a pile of snow outside for several hours.

5 Vacuum filter the mixture as it is cold. Collect the solid. Discard the liquid.

6 Add dilute nitric acid to the urea nitrate, heat the mixture and stir heavily, do this until all of the urea nitrate dissolves, then let the mixture cool down again.
This recrystallizes the urea nitrate and helps get rid of impurities trapped in the urea nitrate.
This step also dilutes and dissolves the impurities in the water, while the urea nitrate precipitates out at lower temperature.

7 Cool down the mixture for several hours again.
Either use a fridge or snow.

8 Vacuum filter the cold mixture. Collect the solid. Discard the liquid.
One can also wash the urea nitrate in the filter a few times with water or very dilute nitric acid.
Make sure to dry the urea nitrate as much as possible.
Vacuum filtering works well for this. Letting the water evaporate on its own may take a while.

Again if your goal is to produce urea nitrate then you simply collect the pure urea nitrate that has been produced. But if you want pure urea then you continue with the steps.

9 Add a small amount of water, and then concentrate potassium carbonate (other carbonates may work as well, like sodium carbonate).
The reaction taking place is:
$2\ (NH_2)_2COHNO_3 + K_2CO_3 \rightarrow 2\ (NH_2)_2CO + 2\ KNO_3 + CO_2 + H_2O$

Using sodium carbonate the reactions would be:
$2\ (NH_2)_2COHNO_3 + Na_2CO_3 \rightarrow 2\ (NH_2)_2CO + 2\ NaNO_3 + CO_2 + H_2O$

Notice: The reaction will produce a lot of bubbles. So have some space in the vessel.

10 Heat the mixture using a water bath.
This is done to evaporate the water.
But it is important to not heat it too much, and definitely not to a boil, because this will decompose the urea.
Once all water has evaporated there should only remain a solid urea and potassium nitrate cake.

11 Add boiling hot ethanol to the solid cake.
Urea is very soluble in ethanol. While potassium nitrate is almost insoluble in ethanol.
Mix until the cake breaks down into small powder in the ethanol.

12 Vacuum filter this. The solid is potassium nitrate. The liquid is a mix between ethanol and urea.

13 Heat the ethanol to evaporate it off.
Ethanol has a lower boiling point than that of water, so it is safer to approach boiling, as it will not decompose the urea.
But for safety keep the temperature at the point where it just visibly evaporates.
Evaporate off most of the ethanol.

14 Cool down the small amount of ethanol containing the urea.
Place it in a fridge or snow, for several hours.
Let the urea precipitate out.
Try mixing it a bit if it doesn't precipitate.

15 Vacuum filter and collect the solid urea.

Ammonia

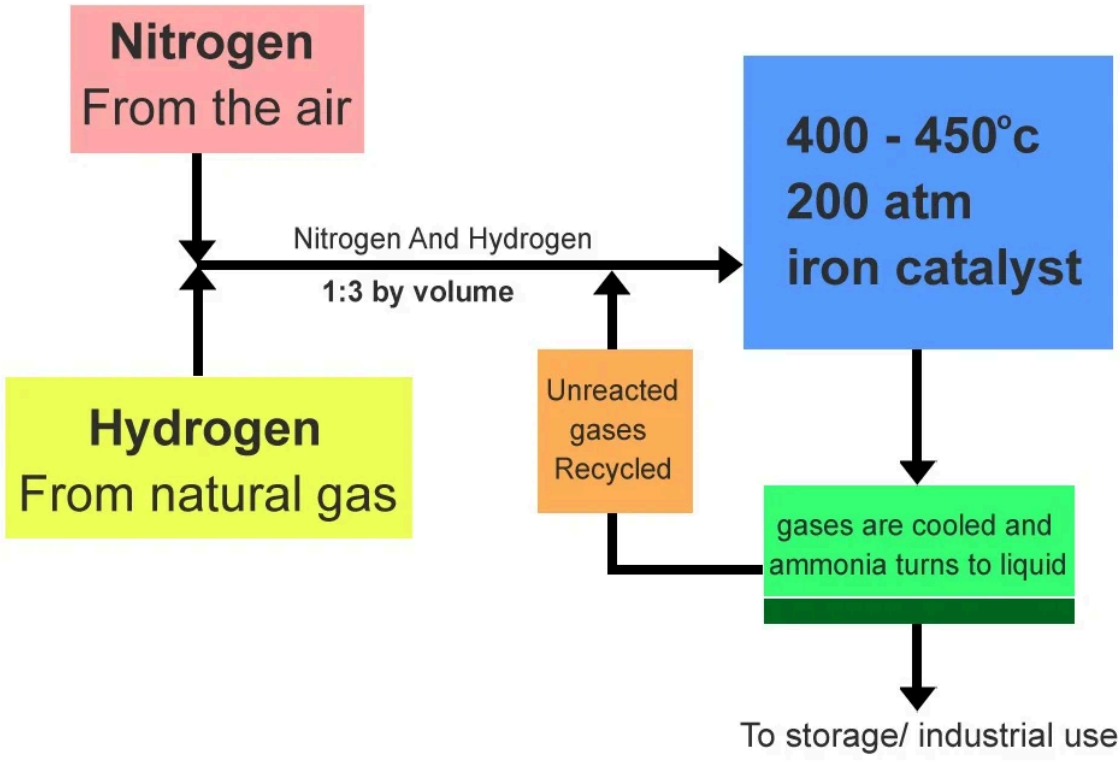
Ammonia solutions in water can be bought. Lab grade ammonia is usually 25% and harder to come by.
But you can buy household cleaning 5-10% ammonia solutions.

Ammonia is a gas. Naturally if you produce ammonia you should bubble it immediately into the medium it will react in.
But if you want to store it you can bubble it into water and save that water. But this is only recommended if the reaction can take place with water present.
For example: when making ammonium nitrate, one way is to bubble ozone gas into ammonia in water.
Solubility in water:
47% w/w (0 °C)
31% w/w (25 °C)
18% w/w (50 °C)

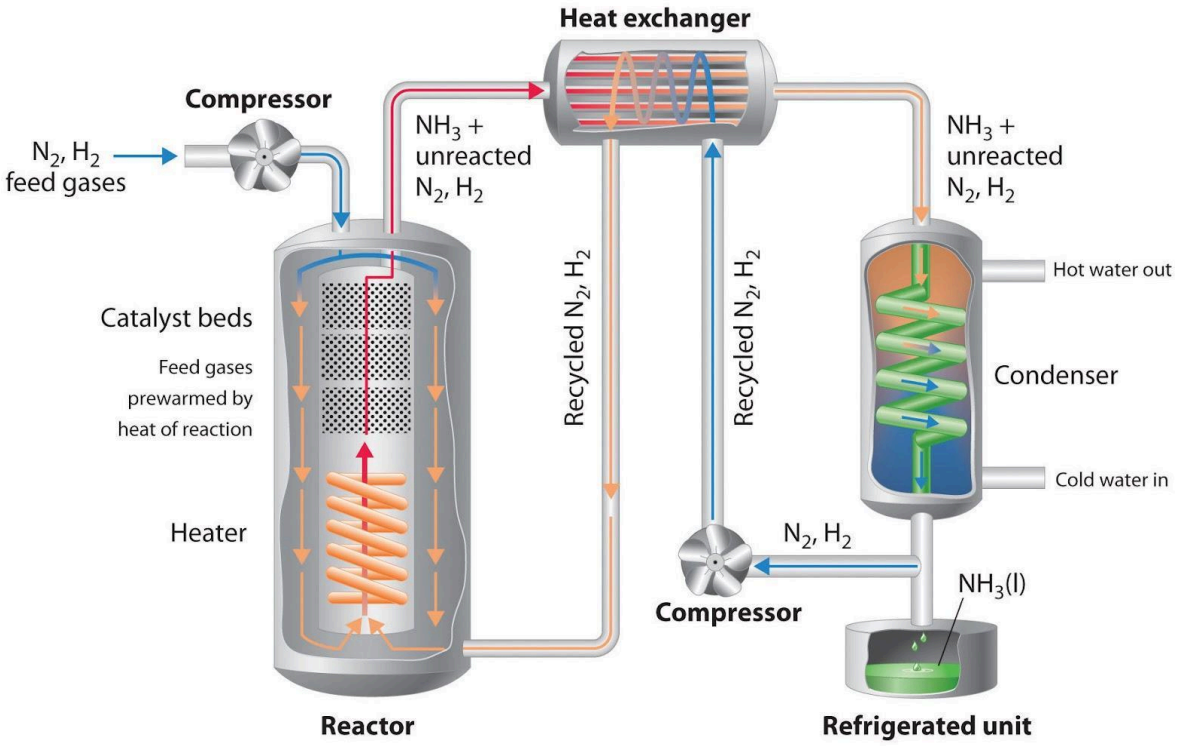
And when making ammonia nitrate the standard way using ammonia and nitric acid, it is most simple to just bubble ammonia gas into nitric acid.
But you could also bubble ammonia into water and then react it with nitric acid.

You can make ammonia in different ways:

Industrially ammonia is made by the Haber-Bosch process:



The cooling is done below the boiling point of ammonia which is -33.34°C. If this is too hard to replicate you can also just push the ammonia gas into water.
This method is quite elaborate:
You most importantly need a metal chamber with catalyst beds of iron. Where you can control heat and pressure.
The nitrogen gas comes from the air, and hydrogen gas is easily produced. So you just fill the chamber with air and hydrogen gas. And perform the reaction.
And since not all gasses likely don't react fully you should have a pathway to allow the unreacted N2 and H2 to recycle back into the chamber.



This is an advanced operation for ammonia and is mentioned if the situation would come that an organization needs to produce its own.

But there are laboratory methods for ammonia as well:

1 Serpek Process[33]
Burning magnesium in a closed environment:
$3\ Mg + N_2 \rightarrow Mg_3N_2$ This makes magnesium nitride
Place the magnesium nitride in water:
$Mg_3N_2 + 6\ H_2O \rightarrow 3\ Mg(OH)_2 + 2\ NH_3$ This makes magnesium hydroxide and ammonia gas

2 Decomposing Urea with Hydroxide[34]
CO(NH2)2 + 2 NaOH → 2 NH3 + Na2CO3
Use enough water to dissolve the urea and sodium hydroxide in it and mix.
Use temperature between 60-90°C (mild boiling if distilling)
Reaction takes 10-30 min.
Using excess sodium hydroxide is ok.

[33] "Direct synthesis of ammonia gas (Serpek Process)", Astral Chemistry, 28 Jan 2017
https://www.youtube.com/watch?v=ZRFai58q1J8
[34] "Making anhydrous ammonia from urea and sodium hydroxide", Thy Labs, 24 Aug 2021
https://www.youtube.com/watch?v=zbCpuEWLOww

Basically:
Dissolve sodium hydroxide and urea in water.
Heat and stir.
Distill the ammonia gas.
Either directly into the next reacting medium or into water.

Erythritol

Erythritol is a sugar substitute and easily bought online or in stores.
Erythritol is made by fermentation and takes 3-5 days to complete.
And the process is hard to execute, so buy it instead, but here are the directions:
Use glucose, high-glucose syrup or purified dextrose. And mix with water.
100-200g/L
Add osmotolerant yeast:
Moniliella pollinis
Trichosporonoides megachilensis
Yarrowia lipolytica
Candida magnoliae
(these are engineered or naturally suited for erythritol production)
The conditions for fermentation are:
pH 3.5-6
Temperature 28-32°C
Moderate aerobic conditions
Duration 3-5 days

Again for now erythritol is very easily purchased so do that instead of trying this method. But if one is capable of producing erythritol it is very desirable if they start restricting the purchase of it.

Pentaerythritol

Pentaerythritol can be bought but in some countries this might be one of these items that get flagged. So don’t be surprised if they ask for intended use.

Otherwise it can be produced by reacting acetaldehyde and formaldehyde, this reaction uses sodium hydroxide or calcium hydroxide as catalyst.

CH_3CHO (acetaldehyde) + 4 CH_2O (formaldehyde) + $Ca(OH)_2$ → $C_5H_{12}O_4$ (pentaerythritol) + $CaCO_3$ + H_2O

The reactants are dissolved in water.
Catalyst is either NaOH or Ca(OH)2
Temperature 50-90°C
And the process takes several hours.
Notice that acetaldehyde and formaldehyde have very low boiling points, I highly recommend doing this in a closed system or semi closed system using a very long condenser, ideally a cooled condenser.

Basically:
Mix acetaldehyde and formaldehyde in water, and place this in a reflux set up, closed ideally or using a long cooled condenser.
Heat and stir, and let this reflux for several hours. (calcium carbonate will precipitate out of the reaction).
Once complete you pour the hot mixture through a paper filter to remove the calcium carbonate.
Then simply boil off the water and pentaerythritol will be left.

Naturally you could combine operations:
Heating and passing ethanol vapor over a catalyst into water.
Heating and passing methanol vapor over a catalyst into the same water.
When all reactants are produced into water, close the system and reflux for several hours.
And then you have pentaerythritol.

Methylamine

Methylamine is a gas at room temperature and so needs to be dissolved in water. Normally the concentration is 40% methylamine and 60% water of the mixture used.
Methylamine requires a license to be purchased. In practise you cannot buy this as private individual though synthesising it is not that hard:

A simplification of the formula is:
$NH_3 + HCHO \rightarrow CH_3NH_2 + H_2O$
The reaction involves reacting ammonia and formaldehyde. This will generate methylamine and water.
And this reaction is carried out with the reactants dissolved in water.

So you simply mix aqueous ammonia and formaldehyde (typically 10-28% and 37% respectively)
And reflux at 50-70°C, I recommend a closed system or semi closed with a tall cooled condenser.
And methylamine is very soluble in water and will stay in the water when being produced.
When you wish to use the methylamine you either use it as a solution in water or heat it to distill it into another mixture.

Another option is using an ammonium salt like ammonium chloride, but in this case you need a base like sodium hydroxide.
$NH_4Cl + HCHO + NaOH \rightarrow CH_3NH_2 + NaCl + H_2O$.

This reaction is done exactly the same except after reflux you add sodium hydroxide.

Meaning prepare ammonium chloride and formaldehyde in water and reflux. And then add sodium hydroxide.

Guanidine Carbonate

It is hard to find or buy pure guanidine carbonate, but it is easily extracted from no-lye hair relaxers based on guanidine carbonate.
If you can find no-lye hair relaxers based on guanidine carbonate you can extract it by following process:[35]

1 Mix the (Guanidine Carbonate Based) No-Lye Hair Relaxant with Acetone.
This will precipitate the Guanidine Carbonate.
2 Vacuum Filter (coffee filter or towel filter) and then wash the Guanidine Carbonate a few times with acetone before Collecting the Guanidine Carbonate. The extra washing is done to try and remove more additives.

Cyanamide

Calcium cyanamide (CaCN2), is the most common and sold as fertilizer.
There's also calcium-free cyanamide (H2NCN), sometimes called cyanamide or cyanoguanidine precursor. But this chemical is more used industrially and harder to find on the market.

You may be able to find this chemical in herbicides and pesticides as well.

Aminoguanidine

Adding calcium cyanamide (CaCN2) to water generates cyanamide gas, which reacts with hydrazine to make aminoguanidine.

So a simple way to prepare aminoguanidine in a lab is to first make a hydrazine sulfate solution. And then add calcium cyanamide to it.

Molar ratios are 1:1:1 for the reaction.

Calcium Carbide

[35] "Getting Guanidine Carbonate and Hydrochloride from No-Lye Hair Relaxants", NurdRage, 26 Aug 2017, https://www.youtube.com/watch?v=wmWTF3lBDEI

Calcium carbide (CaC2) is used to generate acetylene gas.
It is small rocks that were once used in mines as head lamp fuel. Simply dropping calcium carbide in water will generate acetylene gas.
Acetylene gas is easily trapped in acetone. So you can simply bubble the produced gas into acetone to collect it.

Calcium carbide can be bought in bulk very easily.

Formamide

Formamide can be made by decomposing ammonium formate, to make ammonium formate you react ammonia and formic acid:
HCOOH (formic acid) + NH3 (ammonia) → HCOONH4
This can be done with concentrated and dilute formic acid and ammonia. Meaning having dilute formic acid and ammonia in water is fine.
The reaction happens very fast, a couple of seconds, let it go for a minute to be sure.

So basically slowly add formic acid mixture to ammonia mixture, and once everything is added and you are sure the reaction is complete, you want to extract pure anhydrous ammonium formate.

The melting point and decomposition of ammonium formate takes place well above the boiling point of water. So you can easily boil off or evaporate off the water from the ammonium formate and have pure anhydrous product.

With pure ammonium formate you place it in a reflux set up with a condenser.
Then you heat the ammonium formate to 160-180°C, and let it reflux for 1-3 hours.
The condenser is important so don't forget to have one as part of the system.
Ammonium formate melts at 116°C and decomposes at 180°C.
Make sure to stay below and never exceed 190°C. Because above 200°C side reactions become more dominant forming ammonia, formic acid or even hydrogen cyanide (which is poisonous).
Again use a condenser.

Once finished you have produced pure formamide.

Hexamine

Hexamine, also known as:
Hexamethylenetetramine
Methenamine
Urotropine
Formin

Aminoform
HMTA

Historically hexamine has been used as an emergency firestarter.
As it burns very clean without any smoke.
Note however the burning vapors are toxic.
Hexamine also has a high energy density.

So hexamine can be found and bought as fuel tablets. These are nowadays banned in the UK but might still be available in the EU.

Hexamine has also been used as a preservative for food.
And as a medication to treat urinary tract infection.

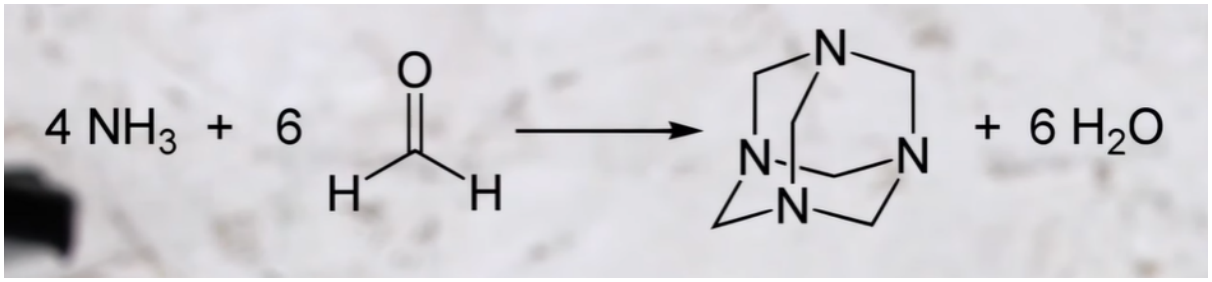
Hexamine has also been a component and precursor for explosives production.
Most notably it is the primary component used to produce RDX.

To synthesize hexamine is quite easy and safe.
Just react formaldehyde with ammonia.

Note that it is important, or beneficial, to use excess ammonia.
You can tell if there's excess ammonia if you can smell it from a distance from the beaker, where the reaction has taken place.
Excess ammonia is beneficial for two reasons:
1 The extra ammonia helps make a more stable end product of hexamine.
2 It means that all the formaldehyde has reacted. Which is good because formaldehyde is toxic and corrosive.
So the mixture is generally safer and more stable with excess ammonia.

The reaction is exothermic.
On small scales it is generally safe to just mix the two reactants immediately.
On a larger scale it could be done in small and slow proportions to exercise some temperature control if needed.

The net formula reaction: (reacting formaldehyde and ammonia)



Equipment:
Glass beaker
Glass rod
Hot plate

1 Add the formaldehyde to the beaker.
2 Add the ammonia and stir with the glass rod.
Make sure to use an excess amount of ammonia
Add slowly if for whatever reason the temperature from this exothermic reaction is a problem.
3 Let the reaction sit for a few minutes while stirring.
The reaction produces mainly hexamine and water, with any excess ammonia solution you used.
4 Put the beaker on the hot plate, and bring it to a boil. To evaporate the water. This will precipitate the hexamine.
Boiling off all of the water might lead to completely dry hexamine which might get burned a little by the heat.
So be mindful of not burning the hexamine as it precipitates out and becomes dry.
One could also boil off most water leaving a little damp hexamine, then letting the hexamine air dry.
Note: Ammonia is a gas, so it will evaporate away with the water. Leaving pure hexamine behind.
You can also dry the hexamine in the oven, after having boiled off most of the water. Just be mindful not to burn the hexamine.

Glyoxal

To make glyoxal:

Method 1: Liquid phase oxidation of acetaldehyde with nitric acid.
2 CH3CHO (acetaldehyde) + 2 HNO3 (nitric acid) → OHC-CHO (glyoxal) + CH3COOH (acetic acid) + 2 NO (nitric oxide gas) + H2O (water)
The reactants are both slowly added over a period of 4 hours and then reacted for 3 hours.
Around a temperature of 40-45°C
Copper nitrate is a good catalyst, and can be combined with sodium nitrite.
The yield will be around 32%.

This reaction has the advantage that you can use dilute reactants, meaning 50% acetaldehyde in water and 50% nitric acid in water.

Basically you prepare a reflux set up with a condenser.
And then you prepare a flask with copper nitrate (40% solution in water), and add if you can 5% solution of sodium nitrite.
Then you slowly add dilute (50%) acetaldehyde and nitric acid, and raise the temperature to 40-45°C.
Then you keep adding, stirring and refluxing over a period of 4 hours.
Once everything is added reflux this for 3 hours.

After that you can extract the glyoxal using distillation though you likely decrease your yield as some glyoxal might decompose upon distillation.

You can also try vacuum distillation instead.

Method 2: Vapor Phase Oxidation of Ethylene Glycol
$HO\text{-}CH_2\text{-}CH_2\text{-}OH + O_2 \rightarrow OHC\text{-}CHO + H_2O$
Temperature 250-300°C
Catalyst silver, copper or copper oxide on silica. Meaning for example copper wire on silica.

Basically pass ethylene glycol vapor over a silver, copper or copper oxide on silica, around the temperature of 250-300°C.
And distill over glyoxal and water.

This method has much better yield around 75-85% if properly set up, compared to liquid phase acetaldehyde reactions.

Method 3: Ozonolysis of Benzene
$C_6H_6 + 3\ O_3 \rightarrow 3\ OHC\text{-}CHO$
This method has a low yield around 30-50%
And it involves using ozone generators, and using excess ozone, so mind the fumes which will be produced. Might be best to do this outside.
Lastly this is done with a temperature of -75 to 0°C.
Basically this needs to be in an ice bath, ideally liquid nitrogen ice bath for negative temps.
The solvents are: glacial acetic acid or chloroform.

The steps are:
1 Dissolve benzene in glacial acetic acid (or chloroform), and place it on an ice bath for 0°C which you will hold throughout the reaction.
2 Then bubble ozone from an ozone generator into the mixture, do this for 1-2 hours. (this achieves benzene triozonide)

3 Then add cold water onto this (ideally with zinc dust) to reduce this into glyoxal.

Here's a stack exchange discussing this synthesis:
https://chemistry.stackexchange.com/questions/7117/ozonolysis-conditions-for-benzene

Ozone generators are used for pools and easily bought. But I suggest taking the temperature seriously as benzene is flammable and ozone is a powerful oxidizer,
It is very important to prevent a runaway reaction.

Ozonolysis of benzene leads to the formation of the primary explosive benzene triozonide. Which is then further prepared into glyoxal.

Lastly I'll add the best method is method 2. You simply prepare a distillation station with copper wire on silica in the middle glass tubing, with a bunsen burner beneath reaching the right temperature. Then you boil over ethylene glycol (dilute works as well), and you will start distilling over glyoxal and water.
With further distillation (ideally vacuum distillation) you can reach pure glyoxal.
And since the yield will be good you could "sacrafice" some glyoxal by doing regular distillation.

Notice also that if the reaction you want to do with glyoxal allows for the presence of water then you don't even need to do distillation for purification. Just use the product you have reached.
But I do suggest purifying the first few times just to see how much end product you get.

Inositol

Is a sugar alcohol.
It can be purchased in health food stores: usually called myoinositol powder. It is sold as a supplement.
Can also be found in pharmacies among the supplements.
And you can also likely find it online.

Sorbitol

Is a sugar substitute and easily bought in bulk.

Mannitol

Is also a sugar substitute and easily bought in bulk.

Solketal

Glycerol and Acetone Method:
$C_3H_8O_3$ (glycerol) + C_3H_6O (acetone) ⟷ $C_6H_{12}O_3$ (solketal) + H_2O (water)
Acid catalyst 5% by weight.

Mix glycerol + acetone + acid catalyst. Use excess acetone for better yield.
Heat to 50-60°C, and reflux for 2-4 hours. With a condenser, and ideally keep it very sealed and cooled. Otherwise the acetone gets boiled off.
Cool the mixture and add sodium bicarbonate to neutralize the acid catalyst, add until the fizzing stops.
Distill off water and acetone at 100°C. You'll be left with solketal.

Xylitol

Sugar substitute which is easily bought in bulk.

Ethyleneurea

Using catalysts like zinc oxide or titanium dioxide, increase the expected yield to 70%. But doing the reaction straight without catalysts will have a yield around 50%.
If you are not using catalysts you might expect a yield around 71.4g ethyleneurea.
If you want to use catalysts add 1-5% by weight (of the ethylene glycol), zinc oxide (ZnO) or titanium dioxide (TiO_2), to the ethylene glycol.

For 100g ethyleneurea (assuming 70% yield):
206g Ethylene glycol (50% conc)
119.6g Urea

1 Charge flask: Add 206.0 g of 50% EG solution (or 103.0 g pure EG + 103 g water if easier) and 119.6 g urea to the flask. Fit with mechanical stirrer (or strong stir bar), overhead gas outlet to hood, and thermometer. Optionally purge with N_2 for 10–15 min (not required).

2 Initial heat (melting & dehydration): Heat gently with stirring to 140–150 °C. Urea will melt (~133 °C). Hold while stirring for 10–20 min to ensure a homogeneous melt. You will observe a clear-to-yellowish molten mixture.

3 Raise to reaction temperature: Increase oil-bath temperature to 210–230 °C (internal mixture ~200–230 °C). Do this gradually (30–60 min ramp). Expect ammonia evolution — vent to hood. Control stirring to avoid splattering.

4 Reaction hold: Maintain ~220 °C (internal) for 2–6 hours, monitoring ammonia evolution. The reaction is progressing when ammonia evolution diminishes and the melt darkens slightly. Do not exceed ~240 °C — overheating increases polymer/tar formation. If you see heavy blackening or very viscous resin early, reduce temperature; polymerization is occurring.

5 End point: When NH_3 evolution slows substantially and the melt appears viscous but not heavily charred (typical 2–6 h depending on scale and exact temperature), remove heat and allow to cool to ~80–100 °C.

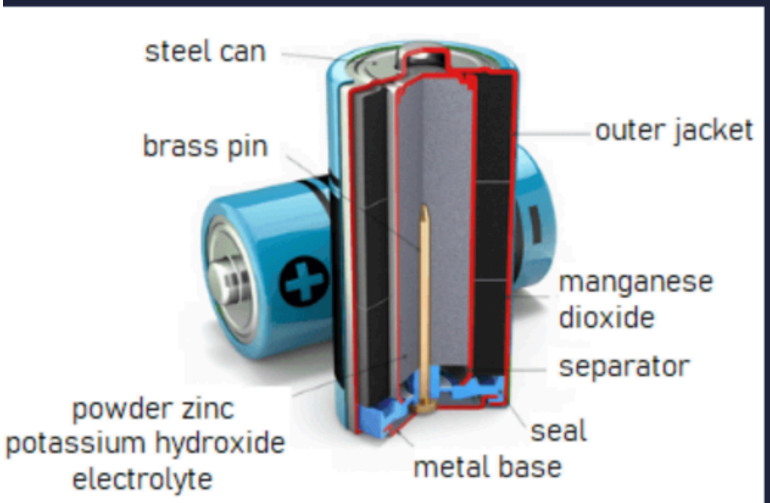
6 Isolation (crystallization): Transfer the still-warm melt to a beaker and dilute by slowly adding ~300–500 mL hot water (≈80–90 °C) while stirring to dissolve soluble materials. Insoluble tars/resins will remain suspended. Filter the hot suspension through a Buchner funnel to remove insoluble polymeric material. Collect filtrate.

7 Recrystallization: Allow the filtrate to cool to room temperature, then chill in an ice bath to induce crystallization of ethyleneurea (mp ≈125 °C, but it will crystallize from the aqueous solution on cooling). Filter the crystals, wash with cold water (small portions), then with cold ethanol (optional) to remove residual inorganic/organic impurities.

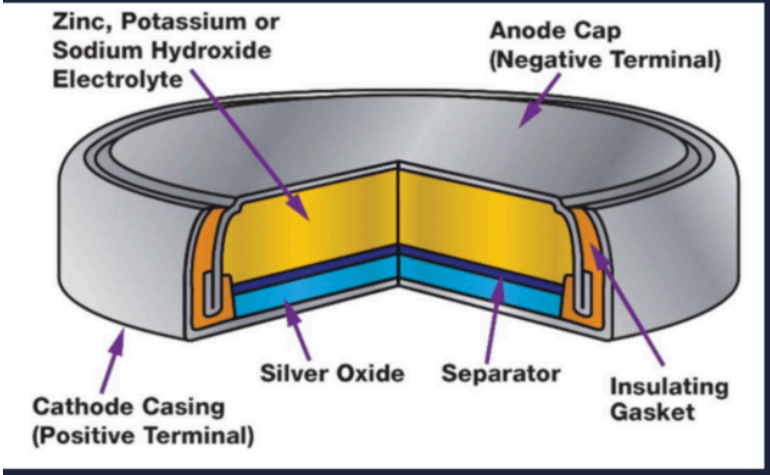
8 Drying: Dry the wet crystals in a vacuum oven at 60–80 °C (≤100 mbar) until constant weight (overnight usually).

Battery extracts

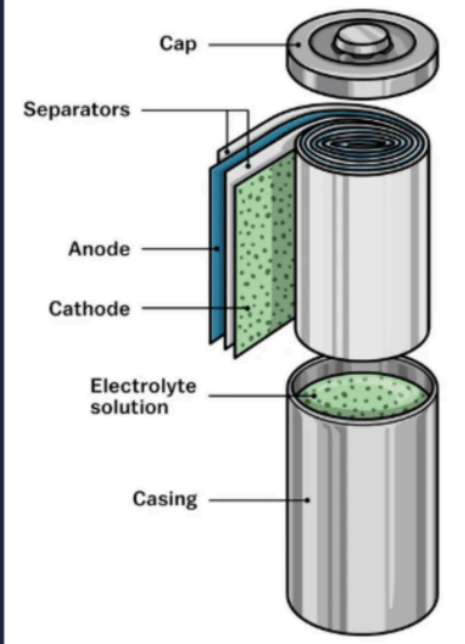
Alkaline battery

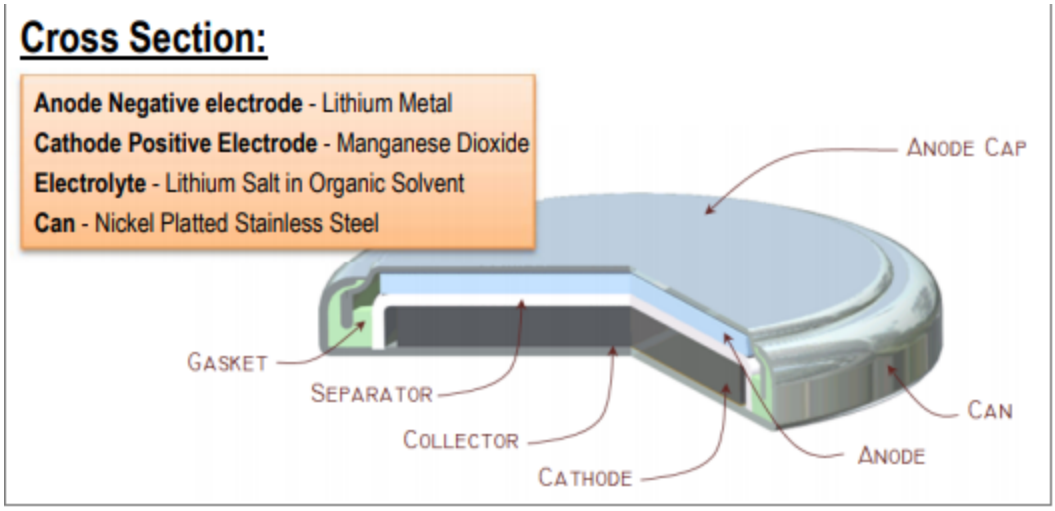


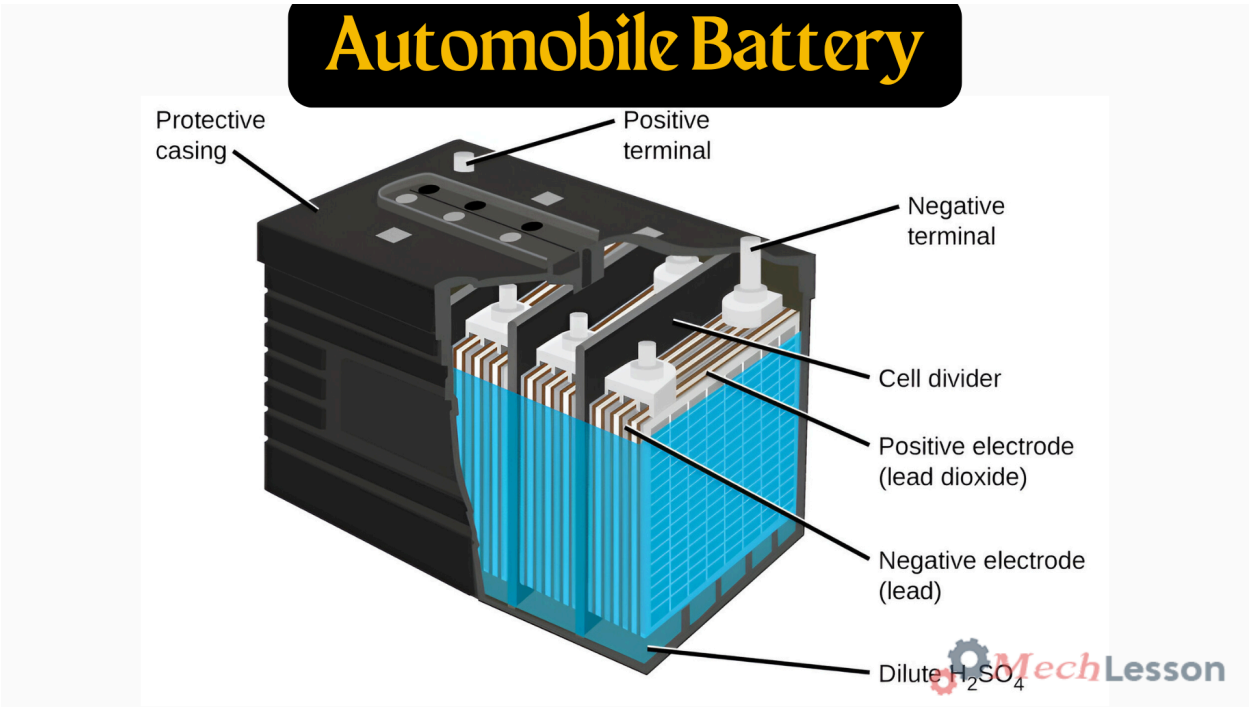
Button cell



Lithium-ion







There are four types of batteries that are useful:
Lead-acid batteries (often car batteries):
From these you can extract battery acid (dilute sulfuric acid), and lead sulfate, lead (electrodes), lead dioxide (electrodes).

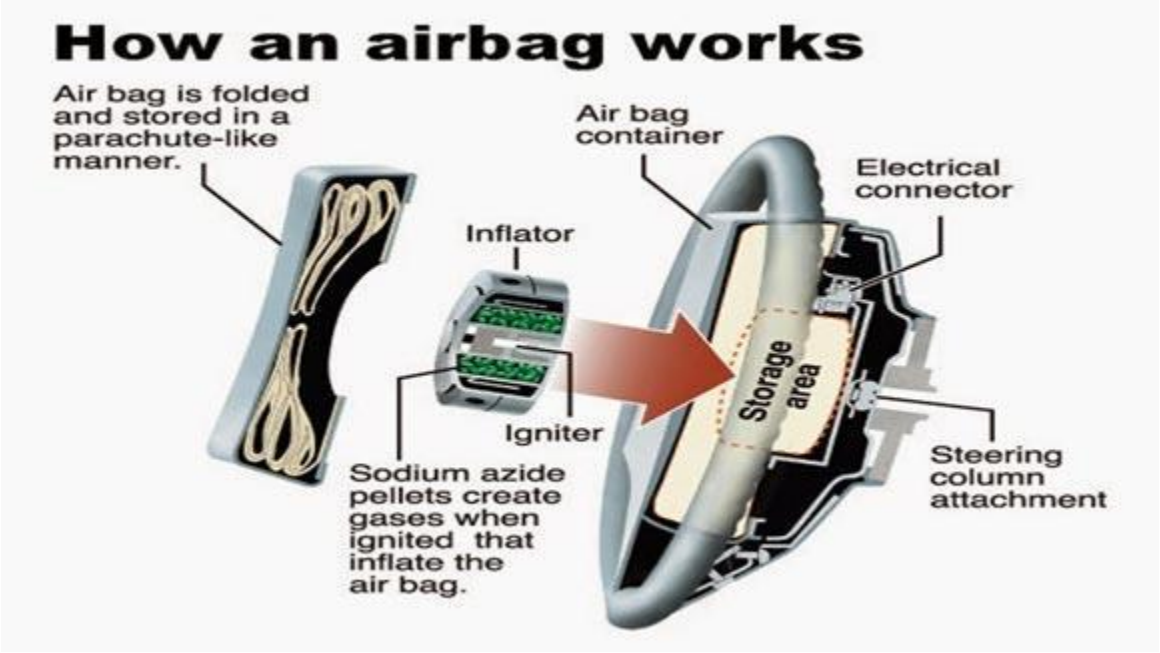
Alkali battery:
From these you can extract manganese dioxide, zinc, and potassium hydroxide electrolyte.

Button cell:
From these you can extract zinc, sodium hydroxide or potassium hydroxide electrolyte, and silver oxide.

Lithium-ion batteries:
From these you can extract lithium perchlorate electrolyte

Electrolyte meaning any medium that allows for ions to move. And in this case the liquid or paste inside of the batteries.

Air bag extract


How an airbag works
Air bag is folded and stored in a parachute-like manner.
Air bag container
Electrical connector
Inflator
Storage area
Igniter
Sodium azide pellets create gases when ignited that inflate the air bag.
Steering column attachment

Common air bag explosive compositions typically contain:
Sodium azide

Potassium nitrate
Potassium perchlorate
Ammonium nitrate
Guanidine nitrate
Nitroguanidine
Tetrazole salts

The compositions are aimed to create a lot of gas to inflate the air bag.
Newer airbags don't use guanidine nitrate or nitroguanidine as much.

Synthesis and Applicability of Explosives

Some explosives mentioned are quite weak and naturally I won't give the statistics on every single one of them. Showing their sensitivity (which is often low) and explosive power, etc.
Naturally some of these are good to find or make to use into making stronger explosives.
And if you aren't familiar with pyro valence, detonation velocity, re factor, then you should go to "basic theory of explosives" and familiarize yourself.

Notice that it is quite easy to find or calculate some of this information yourself. For example if you are going to use sodium nitrate in an explosive you can easily calculate the pyro valence and do the balancing on your own.

As a reminder that density and enclosed spaces are very important in making some explosives explode.
Some will detonate upon a flame, and some will burn.
So when I list density I'm listing the density that gives the corresponding detonation velocity and RE factor.
So generally it is good to carefully, and with proper ballistic protection, pressing some explosives with a cylinder to increase their density.

But this does not apply to liquid explosives which are usually very sensitive and strong as they are, they don't need pressing, and they just revert to their natural density anyways. So never press a liquid explosive.
And never press most primary sensitive explosives as they are usually strong as they are and very sensitive.

Pressing explosives into a compact closed space is done to moderately or very insensitive explosive powders, especially those that are dependent on that.
For example ammonium nitrate and urea nitrate are very insensitive and greatly benefit by pressing.

So again some explosives are generally "weak" as they are when you have made them.
But increasing density and pressure, by pressing/compacting and confining them, make them very powerful.
Especially when they are oxygen balanced in a composition.

So when storing you store them as is in plastic containers. Fuels and oxidizers separately.
And when you want to prepare a composition and device.
You balance and mix them.
Press them and confine them in a proper container. Which will give the right fragmentation you desire.

Remember to always be familiar with the sensitivity of the explosive you are working with and always have proper ballistic protection when pressing them, especially when preparing detonators (which usually involves the more sensitive explosives you might press).

Powders

Generally these powders perform almost on the same level and so the "statistics" given to gunpowder generally apply to all these powders.

Gunpowder

Pyro valence: 0 (if properly balanced)
Density: 1.65 g/cm^3 Detonation velocity: 4250 m/s RE factor: 0.51
Sensitivity: Moderate sensitivity, will burn when in contact with a flame.

There are basically a billion variants and they have slightly different characteristics. But I generally recommend the "theoretical stoichiometry" balance as it in theory is strongest.

$$10\ KNO_3 + 3\ S + 8\ C \rightarrow 2\ K_2CO_3 + 3\ K_2SO_4 + 6\ CO_2 + 5\ N_2$$

Mix the powders using the "bag shake method" or "paper folding method".
The resulting chemicals are what is achieved by combustion.

Potassium nitrate, sulfur and coal are all readily and cheap products to buy.
The coal one should buy is that which is typically used for a grill.
It needs to be grinded down into a powder. Use gloves.

Variant compositions:
(potassium nitrate : charcoal : sulfur) (everything is by weight)

Theoretical stoichiometry
82 : 13 : 5

Typical black powder
75 : 15 : 10

Blasting powders
65-75 : 20-15 : 10-15

Sparks
60 : 30 : 10

2K-powder
70-80 : 30-20 : (no sulfur)

Fuze powder
63 : 6 : 31

Gerb powder
65-70 : 20-18 : 12-15

Smokeless powder

These are sulfur free variants of gunpowder. Generally produces less smoke.

Amid Powder:
40-45 wt.-% Potassium nitrate
35-38 wt.-% Ammonium nitrate
14-22 wt.-% Charcoal

Ammon Powder:
80-90 wt.-% Ammonium nitrate

10-20 wt.-% Charcoal

Armstrong's mixture

This is a mixture of red phosphorus and potassium chlorate, and these are found in match box strips and match heads respectively. For details you can find the extraction details under their names in "common compounds".

Pyro valence:
Red Phosphorus +3 (if limited oxygen) +5 (if sufficient or excess oxygen)
+3 if it goes to P_4O_6 and +5 if it goes to P_4O_{10}.
Potassium chlorate -6
Goes to potassium chloride and all oxygen goes to the red phosphorus.

Balanced formula:
$12\ P + 10\ KClO_3 \rightarrow 3\ P_4O_{10} + 10\ KCl$

Molar mass:
P = 30.974 g/mol
$KClO_3$ = 122.55 g/mol

12*30.974 + 10 * 122.55 = 371.688 + 1225.5 = 1597.188
371.688/1597.188 = 0.23271… ≈ 0.23

Balanced Ratio:
23% by weight red phosphorus
77% by weight potassium chlorate
Proportion: ca 1 : 3.35

Classically Armstrong's mixture has had these ratios:
67% potassium chlorate, 27% red phosphorus, 3% sulfur, and 3% calcium carbonate.
And for military use:
70% potassium chlorate, 19% red phosphorus, 3% sulfur, 3% chalk, and 5% boron carbide.

And if you wanna keep the ideal proportion (ca 1 : 3.35) between potassium chlorate and red phosphorus while still adding sulfur and calcium carbonate, the ratio by weight is:
21.62% Red Phosphorus
72.38% Potassium chlorate
3% Sulfur
3% Calcium Carbonate
This ratio is more commonly used when doing the "wet method".

There are two methods of preparation:

1 Dry/Powder method
Basically you just mix the powders and place them in the bomb.
You can mix the powders in a plastic bag and shake it softly. Or if you wanna be extra careful you place them on a piece of paper, and lift/fold the corners back and forth from different angles to mix the powder.

2 Wet/Liquid method
Basically the mixture is safer to handle when wet and it can be poured into the shell of the bomb which is sometimes easier to do than to add it in the form of a powder.
And once dried it has its shock and heat sensitivity back.

1 Fill a container (ex: beaker) with 100 ml water for each 5 grams of potassium chlorate.
The idea is to not dilute it too much, instead to try and keep it a slurry, this will make the drying process shorter. But add more water if needed to fully wet all of the powder and not leave any part dry. The safe option is to use a little too much water rather than using too little.

2 First of all add calcium carbonate, before adding the other powders.

3 Mix the semi dissolved powders by slowly moving the container in a circular motion, preferably have this done automated and leave it for 10 min.

Notice: When doing this step, do not stir the mix using the type of regular stirring tool, such as a glass rod or stirring bar. It is much safer to use the equivalent of the paper folding method for mixing liquids. By slowly spinning the liquid onto itself.

4 Pour the liquid slurry into the shell of the bomb and let it dry.

Notice: To safely pour the liquid into something like a flask, tilt the flask so that the liquid slides down the edges. Instead of letting it fall into the flask, hitting the bottom.

A flask is a simple and effective choice for a bomb. It causes glass fragments and you can tape the detonation cord to the bottle neck it goes through.
Armstrong's mixture detonates easily, especially when dry.
So a very easy to make time delayed glass fragment device.

Because of the shock sensitivity another option could be to try and throw or place the flask such that it detonates from shock.
Throwing it, or placing it on top of a door might achieve this effect.
Impact sensitive glass fragment device.

Nitrates

It should be said that generally when making nitrates it involves using nitric acid.

And that comes with three important features:
1 Avoid plastics, like plastic gloves as nitric acid reacts with these and produce dangerous vapors.
2 If you notice red or orange vapors, and/or the mixture heats up, stop adding to the mixture and let it cool down. If it continues uncontrollably then you need to dump this in a “dump bucket” almost full of water. It should have enough water to quench the reaction but not over flow.
Though this is mostly something to worry about for some nitration reactions like for example when making RDX.
I will mention when this is an extra risk and a dump bucket should be present.
It is not really a threat or needed when making sodium nitrate, potassium nitrate or ammonium nitrate. Basic and not to sensitive explosives.
Though it never hurts to have a dump bucket always close by in the lab whenever experimenting.
So general advice: have a dump bucket always close in the lab, and especially when you make certain nitrations that I will mention later.
3 Ice baths. Nitrations are exothermic, they generate heat. And this could lead to “run aways” if you just let the reaction heat itself up.
To control the temperature and let reactions cool down as mentioned before you use ice baths. Simply placing the reaction vessel before any reactions on an ice bath and slowly adding the reactants. This allows you to control the temperature with a thermometer. If it heats up beyond the recommended temperature you simply stop adding or stirring and let it cool down.
Generally the temperature can be and should be held under 10 degrees celsius.

It should be added that some reactions can be done using nitric acid with a concentration of 60-70%, and other reactions require pure nitric acid.
Either you acquire or make pure nitric acid with the help of sulfuric acid.
Or as commonly done, you mix a nitrate salt and sulfuric acid to make a pure nitric acid (and slight sulfuric acid) mixture.
The idea is often to try and make a “better” nitrate or stronger explosive. So you can for example mix anhydrous (dry) ammonium nitrate and (pure) sulfuric acid to make a pure nitric acid mixture, and then use that to do a nitration requiring minimum water present.

And so again if you can easily find sulfuric acid and nitrate salts, but not necessarily pure nitric acid, another way is to mix sulfuric acid and the nitrate salt. Making pure nitric acid. And then using that mixture to nitrate what you are aiming to nitrate.

For pure nitric acid, the nitrate salt needs to be anhydrous or dried and the sulfuric acid pure. If you use dilute sulfuric acid or nitrate salt solution then you only get a dilute nitric acid.
So keep in mind whether you need pure nitric acid (99%) or “dilute” nitric acid.
Pure requires dry nitrate salts and pure sulfuric acid.
Dilute allows for nitrate salt solution or dilute sulfuric acid.

You could even use hydrochloric or muriatic acid for this as well, but traditionally they use sulfuric acid because it helps dry the reaction more.
But for dilute purposes using hydrochloric acid works just as well.

The reason being that hydrochloric acid is usually very dilute (commercially 30% conc).

Sodium nitrate, potassium nitrate, ammonium nitrate are salts which are naturally anhydrous, so when they feel dry they are dry and you can use them for pure nitrations with pure sulfuric acid.

But there are certain nitrates that have possible hydrate forms. Meaning they have water built in their structure. For example copper nitrate. Avoid these for preparing nitration mixtures, unless they can be dilute.

Lastly I would recommend sometimes trying certain synthesis with dilute nitric acid. Making dilute nitric acid is quite easy, you can even generate it with a birkeland-eyde reactor (reacting air, electricity and water).
And sometimes the recommendation is to use pure nitric acid because it has better yield. When dilute nitric acid would give an acceptable yield.
Some explosives like nitrocellulose do become very weak doing this, so check explosive strength also.

Sodium Nitrate

For this reaction you want to use sodium hydroxide and nitric acid. Using sodium chloride isn't practical because it causes hydrochloric acid which displaces the nitric acid.
So again you should use sodium hydroxide and nitric acid.
Or sodium carbonate and nitric acid.
Both these reactions have the same procedure.

To produce 100g of sodium nitrate:
47 g NaOH
75 mL HNO_3 (70% concentration)
Or
63 g Na_2CO_3
75 mL HNO_3 (70% conc)

The procedure is to dissolve the sodium hydroxide slowly in water, and then place this on an ice bath. Keep the temperature around 0-10℃.
And then slowly add nitric acid.
You can use 60-70% concentrated nitric acid. Meaning the concentration you could reach through distillation of nitric acid.

Once everything is added and reacted, you place the flask on a hot plate. And heat to evaporate off most of the water. Once it is very saturated you cool it down again using an ice bath.
Once cooled the sodium nitrate will precipitate out.
Filter this and wash it in the filter a few times with cold water.
Let this dry and you are finished.

Potassium Nitrate

The potassium nitrate synthesis works exactly like that of the sodium nitrate production.
Either potassium hydroxide or potassium carbonate reaction with nitric acid.
For 100g the balances are:
56 g KOH
63 mL HNO_3 (Conc 70%)
Or
68 K_2CO_3
63 mL HNO_3 (Conc 70%)

The procedure is to dissolve the potassium hydroxide slowly in water, and then place this on an ice bath. Keep the temperature around 0-10℃.
And then slowly add nitric acid.
You can use 60-70% concentrated nitric acid. Meaning the concentration you could reach through distillation of nitric acid.

Once everything is added and reacted, you place the flask on a hot plate. And heat to evaporate off most of the water. Once it is very saturated you cool it down again using an ice bath.
Once cooled the potassium nitrate will precipitate out.
Filter this and wash it in the filter a few times with cold water.
Let this dry and you are finished.

Ammonium Nitrate

Molar mass: 80.043 g/mol
Pyro valence: -2
Density: 0.88 g/cm^3 Detonation velocity: 2700 m/s RE factor: 0.32
Melting point: 169.6℃
Sensitivity: Very insensitive and safe to handle. Doesn't burn when presented with a flame and will just melt instead.

Method 1: Ammonia solution and nitric acid.

Using household cleaning ammonia (10% conc) and nitric acid (70% conc), the balance for 100g ammonium nitrate the balance is:

222 mL NH_3 (10%)
79 mL HNO_3 (70 conc)

The reaction goes similarly to sodium and potassium nitrate.
Place ammonia on an ice bath, and slowly add nitric acid, keep it below 10 degrees celsius.
Once finished:
Notice that ammonium nitrate is a little more sensitive to decomposition. So when you intend to remove the water you shouldn't heat unnecessarily much.
Heating to 60-80 degrees celsius and letting the water slowly evaporate is fine.
But don't heat the mixture well over 100 degrees celsius. Ammonium nitrate decomposes at 210 degrees celsius, and there might be traces of decomposition before that.

Once it is dried remember to wash it a few times with cold water in a filter and dry it again.

Method 2: Ammonium carbonate and nitric acid.

The reason you want ammonium carbonate is the other salts really don't work as well.
Ammonium hydroxide is unstable and is basically just ammonia dissolved in water, and so that method is already covered.
Ammonium chloride and sulfate produces acids which try to displace the nitric acid.
Ammonium bicarbonate is less cost effective as you need basically 50% more of it compared to ammonium carbonate.
I will mention the balance for ammonium bicarbonate if the case is that you can only find that salt.
But again ideally use ammonium carbonate, and use ammonium bicarbonate if you must.

For 100g of ammonium nitrate:
60 g NH_4CO_3
79 mL HNO_3 (conc 70%)
or
99 g NH_4HCO_3
79 mL HNO_3 (conc 70%)

Dissolve the ammonium carbonate (or bicarbonate) in water and place on an ice bath. Slowly add nitric acid.
Keep it below 10 degrees celsius.
And then once everything is added and reacted you gently heat and evaporate the water.
Wash a few times in a filter, dry again and then you're finished.

Method 3: Ammonia and ozone.

This is a different method using store bought ammonia (10% conc) and air.
Ammonia reacts with ozone to make ammonium nitrate.

And so a simple cost effective method to generate ammonium nitrate is to bubble ozone gas into ammonia solutions, by using an ozone generator to convert oxygen into ozone and bubbling it straight into the ammonia solution.

The only downside to this method is that it takes a long time, a few weeks to a month depending on how much you want to yield. And so if you need ammonium nitrate fast you should do the other methods. But if you have a lot of time and want to avoid using expensive material (which can raise suspicion), then this is an excellent method to yield a lot of ammonium nitrate.

Stoimetrically for 100g of ammonium nitrate you need:
213 g NH_3 (10% conc)

And then you buy an ozone generator (these are often used to clean pools) and bubble ozone gas into the reaction for a few weeks or even a month if you want.

There are several ways to catalyse the reaction:
UV-light helps, but makes the operation more costly.
Active carbon (GAC, PAC), this provides a surface that helps decompose the ozone and react.

But you can also do the reaction straight, meaning just bubble ozone into ammonia solutions.

I recommend watching the video that Darian Ballard has made.[36]

And once done you gently heat to evaporate the water.

Method 4: Ammonium sulfate and Calcium Nitrate.

This reaction is also slightly different. This is a faster method which doesn't use nitric acid. And doesn't need an ice bath like the ozone and ammonia method.

$(NH_3)_2SO_4 + Ca(NO_3)_2 \rightarrow 2\ NH_3NO_3 + CaSO_4$

For 100g of ammonium nitrate:
83 g $(NH_3)_2SO_4$ (ammonium sulfate)
103 g $Ca(NO_3)_2$ (calcium nitrate)

And you will also be making ca 85 g of calcium sulfate in the process.

Procedure:
1 Dissolve ammonium sulfate and calcium nitrate in water, in separate beakers.

[36] "Ammonium nitrate from store bought ammonia & air", Darian Ballard, 5 March 2021, https://www.youtube.com/watch?v=ueYvcbg69zg

2 mix the two solutions and mix heavily
3 The calcium sulfate that forms will precipitate as it is not very soluble in water.
4 Filter and collect the calcium sulfate. The remaining liquid is an ammonium nitrate solution.
Repeat this step a few times if needed, meaning keep filtering it as calcium sulfate precipitates out, as this skews the reaction to make more ammonium nitrate.
Once it stops precipitating meaningfully you move on to extract the ammonium nitrate.
5 Use gentle heat to evaporate the water off of the ammonium nitrate.

Urea Nitrate

Molar mass: 123.068 g/mol
Pyro valence: +1
Density: 1.67 g/cm^3 Detonation velocity: 4700 m/s RE factor: 0.77
Melting point: 157℃
Sensitivity: Very insensitive and safe to handle. Doesn't burn when presented with a flame and will just off-gas instead.

Density and confinement plays a huge part in getting a strong detonation. So pressing and confinement is highly recommended.
Steel pipes or steel confinement works best with urea nitrate.

There's two general methods for urea nitrate. And both are covered by Dugan Ashley in his video.[37]

Method 1: Nitrate-Acid-Urea.

For this reaction you need urea, an acid and a nitrate salt.
The cheapest and most easily found variant is using hydrochloric acid and sodium nitrate.

Balance:
1 g Urea
1.45 g $NaNO_3$
3.35 g HCl (31.45%)
2 g H_2O (regular water)

Theoretical yield is: 2.06 g urea nitrate.
But Dugan reports his practical yield for this method around 70%.
Which is around 1.44 g urea nitrate.

[37] "The #1 Best Gorilla Explosive", Dugan Ashley, 5 May 2025, https://www.youtube.com/watch?v=TPBQnnKARbE

Use these ratios to calculate how much materials you need to reach the wanted amount of the end product.

Procedure:
Prepare the beaker with the water, and add the sodium nitrate and hydrochloric acid.
Gentle heat around Ca 40-50℃ range.
And then add the urea. If you have pellet urea you can grind it into powder before adding.
The reaction is actually endothermic, it gets colder so heating gently slightly helps the reaction, though it technically works without heating.
Once complete you cool the mixture to 0℃.
And filter the urea nitrate which precipitates out.
Dry on 60℃.
What you achieved at this point is urea nitrate with sodium chloride contamination. It can be called crude urea nitrate.

Crude urea is more insensitive than regular urea nitrate.
But it can be detonated. And using aluminium helps detonate it, ratio by weight 2:1 for crude urea nitrate and aluminium.

But to reach a pure product you need to recrystallize.

100 g of water per 50 g of crude urea nitrate.
Heat it on stirring until everything dissolves. Once it is clear, take it off heat and cool it again to 0℃. And once it has precipitated, filter it and collect.

Method 2: Urea-Nitric acid.

For this method it is recommended to use a slight excess of urea, around 1-2% more than stoichiometrically balanced. This is because urea is a very cheap and readily available product, meanwhile nitric acid is more expensive and harder to come by. And so it helps ensure you use up all the nitric acid that you have.

This reaction does use nitric acid but doesn’t need an ice bath. It is sufficient temperature control to slowly add the urea. And if necessary you can just add ice directly into the mixture to cool it. Dugan reports seeing temperature spikes after ten minutes of dumping in all the urea at once, and can easily cool with adding ice and water.
He even reaches temperatures upwards to 70℃.
But slowly adding urea and having ice nearby is more than sufficient temperature control. It is just a question of time of how slow you want the reaction to take place.
15 min of reaction time is probably sufficient but you can go a full half hour if you want to ensure it has fully reacted.

For 100g of urea nitrate:
49 g Urea (stoichiometrically) (highly recommended to instead use) 50 g of Urea
51.5 mL Nitric Acid (70% conc)

Basically it should almost be 1 g urea per mL of nitric acid. The exact recommended ratio is 1.0303…
Meaning you multiply the amount of urea with 1.03 and use that amount of mL of nitric acid.
Or just the 50 g to 51.5 mL.

Procedure:
Prepare the beaker with cooled nitric acid (from the fridge).
Slowly add the urea. If the temperature increases a lot you can just add ice and/or water to help cool it.
Once everything is added, you let it react for 15-25 min, preferably while stirring.
Then you cool it to 0℃.
Filter this and collect the urea nitrate in the filter.
Wash it with isopropanol alcohol (95%) if you want to help dry it.
And then heat the urea nitrate to 60℃ to dry it.

The end product is really pure and doesn't need to be recrystallized to be used. But if you intend to store it for a long time it is recommended to recrystallize it once with water.
Same method as in method 1.
100 g of water per 50 g of urea nitrate.
Heat, dissolve, once it is clear, cool it to 0℃, filter, and dry.

Guanidine Nitrate

Molar mass: 122.084 g/mol
Pyro valence: +4
Melting point: 213℃
Sensitivity: Less explosive and sensitive compared to ammonium nitrate.

You may be able to find this substance in the gas generator for airbags.
Older airbags use sodium azide, potassium nitrate and silica. And some newer ones incorporate guanidine nitrate.
So when picking apart an abandoned or stolen car, remember to check the gas generator in the airbag for explosives.

This material is also a precursor for even stronger explosives like nitroguanidine.
How is it made:

Guanidine carbonate-nitric acid method:

$(GH)2CO3 + 2\ HNO3 \rightarrow 2[GH][NO3] + H2O$

This reaction works with 30-70% nitric acid. Using 70% is recommended and leaves less water to remove from the end product.

For 100g of guanidine nitrate:
73.7 g Guanidine carbonate
51.9 mL HNO3 (70% conc)

Procedure:
1 Dissolve the guanidine carbonate in water and place it on an ice bath. Once dissolved and cooled:
2 Slowly add nitric acid and stir. Keep the temperature below 10℃.
3 Once everything is added, keep stirring and let it react. When it no longer produces CO2 gas it is finished.
4 Heat and evaporate off the water.

If you intend to explode or store the guanidine nitrate you should do a recrystallization. Simply dissolve it in water and boil off the water again.
If you intend to use it in another nitration reaction (like to make nitroguanidine) then you can use it as is. Any traces of nitric acid would be no problem.

Cyanamide-Ammonium Salt-Nitric acid method:

There's different cyanamide and ammonium salts that can be used.
There's calcium cyanamide and cyanamide.
There's ammonium carbonate, ammonium chloride, etc.

I will describe using calcium cyanamide and ammonium carbonate as these are most easily found.
But the reaction procedure is the same irrespective of which cyanamide and ammonium salt you choose.
Notice however the formula and weights depend on what reactants you choose.

Formula using calcium cyanamide and ammonium carbonate:
CaCN2 (calcium cyanamide) + (NH4)2CO3 (ammonium carbonate) + 2 HNO3 (nitric acid) → 2 [HNC(NH2)2]NO3 (guanidine nitrate) + CaCO3 (calcium carbonate precipitate) + H2O
Molar ratio: 1:1:2:2:1:1

Or 1:1:2:2

For 100g of guanidine nitrate (using calcium cyanamide and ammonium carbonate):
32.8 g Calcium cyanamide
39.3 g Ammonium carbonate
51.9 mL nitric acid (70% conc)

This route also produces 41 g of calcium carbonate precipitate which needs to be filtered off.

Formula using cyanamide:
$2\ H_2NCN$ (cyanamide) + $(NH_4)_2CO_3$ + $2\ HNO_3 \rightarrow 2\ [HNC(NH_2)_2]NO_3$
Molar ratio: 2:1:2:2

For 100g of guanidine nitrate (using cyanamide and ammonium carbonate)
34.4 g Cyanamide
39.3 g Ammonium carbonate
51.9 mL nitric acid (70% conc)

This route produces no calcium carbonate precipitate which needs to be filtered off.

Procedure:
1 Dissolve the calcium cyanamide (or regular cyanamide) in water. And place this on an icebath.
2 Slowly add ammonium carbonate and stir, keeping the temp below 10℃. If everything doesn't dissolve add more water. And once everything is added:
3 Slowly add nitric acid and stir, keeping the temp below 10℃. Calcium carbonate will begin to precipitate out if you used calcium cyanamide.
4 Once everything is added and doesn't precipitate anymore. You filter off and collect the solid calcium carbonate. To be sure everything has precipitated you can leave the reaction vessel in a fridge for a few hours.
5 Boil off the water and collect the guanidine nitrate.

Again if you intend to use this as a precursor in another nitration then no need to recrystallize it further. But if you intend to store or detonate it, then dissolve in water and then boil off the water again.

Ammonium nitrate-Urea-Silica Gel method:[38]

The “Boatright-Mackay-Roberts (BMR) process”, involves melting urea and ammonium nitrate together in the presence of silica gel which generates guanidine nitrate.

2 NH2CONH2 (Urea) + NH4NO3 (Ammonium nitrate) → [C(NH2)3]NO3 (Guanidine Nitrate) + 2 NH3 + CO2

For 100g guanidine nitrate:
66g Ammonium nitrate
98g Urea
22g Silica gel

Note: on the internet they typically use way too much ammonium nitrate, and way too little urea. Meaning they don’t achieve full reaction or yield. I give the stoimetric balance which shows that there should be more urea than ammonium nitrate. But in many internet syntheses they use more ammonium nitrate than urea, which might explain their low yields.

Note: this reaction produces ammonium gas and carbon dioxide. So do this in a well ventilated area preferably outside.

Note: Lastly the reaction vessel should be something made out of metal. You should not be heating these reactants and melting them in glassware, potentially damaging the glassware.

Procedure:

1 Mix all substances, ammonium nitrate, urea, silica gel, thoroughly in a large pan or metal bowl.
2 Heat the reaction vessel to around 200℃. Until the mixture melts. And starts releasing gas.
Ideally see if you can apply some automatic stirring to the molten solution.
3 Hold the temperature and let it react for 4 hours.
If the reaction clearly is finished and doesn’t produce any more gas, then you can move on.
Remove any stirring gadgets before moving on.
4 Cool down the mixture below 100℃, and start adding water to dissolve most of the mixture.
Heating the water close to boiling to help dissolve the mixture is fine.
Once almost everything dissolved:
5 Filter the solution. The silica gel will be trapped in the filter.
6 Take the liquid solution and heat and evaporate off most of the water.
The solubility of guanidine nitrate in water is 50g/L. So try and remove as much water as possible.
For example if producing 200g, and you only have 100mL left, you are only expecting to lose 5g, which is pretty acceptable and an unimportant loss.
7 Place the remaining slurry, mostly guanidine nitrate and an unimportant amount of water that holds an insignificant amount of guanidine nitrate, in a refrigerator.

[38] “Guanidine nitrate synthesis from urea and ammonium nitrate (dihydrazino tetrazine DHT part 1)”, NinjaChemist, 30 Mar 2025 https://www.youtube.com/watch?v=A6ppJo1VDpU

Let the slurry cool down, and sit for many hours letting the remaining guanidine nitrate precipitate.
8 Filter and collect the guanidine nitrate.
9 Recrystillization can be done using water. Though notice the need for this is lesser because no powerful acids were used.

Silver Acetylide/Silver Nitrate Double Salt (SADS)

Sometimes called silver acetylide double salt (SADS). Or more rarely SASN.
Silver acetylide has a detonation velocity around 1980 m/s.
But the double salt is between 2200 - 4400 m/s.

Because it is a composition, meaning a combination of explosives, you have regular 1:1 molar ratio formula: Ag2C2 * AgNO3, with a pyro valence or oxidation state of +5
But then you have the balanced composition which is more interesting in explosive literature:
Ag2C2 * 2 AgNO3, with a pyro valence or oxidation state of +0.
The molar ratio here is 1:2

Molar mass for molar ratio 1:1: 409.63 g/mol
Molar mass for molar ratio 1:2 (often used in detonator literature): 579.50 g/mol
Pyro valence for molar ratio 1:1: +5
Pyro valence for molar ratio 1:2: +0
Density: 2.5-5.3 g/cm^3 Detonation velocity: 2200-4400 m/s
Decomposition temperature (explodes): 203℃
Sensitivity: Extremely sensitive to heat, shock and friction. Slight disturbances can lead to detonation.
The wet form is relatively stable, but once dried it is very sensitive and powerful.
This is a primer. Not recommended to produce more than 5 g at a time.

Minimum load to detonate secondary explosives with SADS is 40mg. But Dugan recommends +50mg and sometimes even 0.5g

Procedure:[39]

The official academic route:

[39] “SADS [primary explosive]”, Dugan Ashley, 19 Oct 2023 https://www.youtube.com/watch?v=R9rlhJrFmKc

50 g AgNO3
200 cm^3 H2O
30 cm^3 HNO3 (70% conc)
You mix these and heat to 80-90℃
And then bubble in acetylene gas.

Dugan's method:

First he prepares silver nitrate by dropping nitric acid on silver.
He keeps doing this and stirring every now and then, until the silver becomes white and is slightly dissolved.
He then decants the silver nitrate/nitric acid liquid into a new beaker, leaving the silver chunks behind.

He then prepares acetylene gas by dropping calcium carbide into water, and bubbles the acetylene gas into acetone.

Finally he adds the acetone containing acetylene gas into the silver nitrate/nitric acid mixture.

Once the reaction stops fizzing and the double salt has been precipitated: he filters it and collects it in the filter.
And then washes it a few times with cold acetone.

Do not wash the double salt with isopropanol alcohol as this can immediately cause a runaway reaction. This could even lead to an explosion.
AGAIN DO NOT WASH THE DOUBLE SALT WITH ISOPROPANOL ALCOHOL.
Watch Dugan's video where he demonstrates why.

Lastly he lets it dry. And once dried it is ready to be used.

Long term storage of SADS can cause some reversion to silver nitrate.
The mixture 15% nitrocellulose and 85% SADS reverts less and is more fitting for long term storage.
Dissolve nitrocellulose in small amounts of water, add SADS, and then let it dry.

Methylammonium Nitrate

This explosive is comparable to ammonium nitrate having similar explosive properties.

Molar mass: 94.07 g/mol
Pyro valence: +4
Sensitivity: Similar to that of ammonium nitrate.

Formula:
CH_3NH_2 (methylamine) + HNO_3 → $CH_3NH_3NO_3$ (methylammonium nitrate)

Both diluted methylamine (40% conc) and nitric acid (70%) is used.
As it is likely you might produce your own methylamine; I recommend you first calculate the methylamine needed and aim to produce that, and do this in the amount of water needed for 40% concentration.
Basically calculate the needed pure methylamine, and then the needed water.
(Methylamine volume) / 0.4 = total volume
Total volume - methylamine volume = water volume.
The water volume is the amount of water you dissolve the ammonia and formaldehyde in.

Although you can also go by rule of thump. Basically slowly adding, dripping even if needed, nitric acid into the methylamine solution until it stops reacting.
Using indicators for pH and titration for this is recommended.

To produce 100g methylammonium nitrate:
82.5g or 91.7mL CH_3NH_2 (40% conc) (methylamine)
95.6g or 67.3mL HNO_3 (70% conc)

Procedure:
1 Put the methylamine solution on an ice bath.
2 Slowly add, drip if necessary, nitric acid into the mixture, stir and keep the temperature below 10℃.
3 Once everything is added and has reacted: heat the solution to 40-50℃. And evaporate the water with gentle heat.
4 Place the methylammonium in a filter and wash quickly with small amounts of cold water or cold ethanol.
5 Let it dry.

Erythritol Tetranitrate (ETN)

Molar mass: 302.108 g/mol
Pyro valence: -2
Density: 1.72 g/cm^3 Detonation velocity: 8206 m/s RE factor: 1.6
Melting point: 61℃
Sensitivity: Medium sensitivity to shock and friction. Extremely sensitive when melted (even more so than TATP), and when resolidified will still be slightly more sensitive than before melting.

Dugan dedicates an entire video to explain the background information for ETN because of the nature of ETN is quite dangerous.
It is very powerful and useful especially since it is an oxidizer explosive. But care and proper understanding is needed. This is one of the most common explosives that amateurs make not understanding the risk and maim and even kill themselves.

Dugan says:[40]

Erythritol tetranitrate (ETN) is an explosive very similar to pentaerythritol tetranitrate (PETN). The difference being that ETN is slightly more sensitive and slightly less powerful.

It is an advanced explosive. Meaning its characteristics can vary heavily. In the solid state it is moderately sensitive. But melted and in the liquid state it is extremely sensitive.

ETN was discovered in 1849 by Jon Stenhouse.

ETN is the result of nitration of erythritol.

Erythritol is itself a sugar alcohol. Which was originally extracted from seaweed or algae.

[40] "ETN Overview [erythritol tetranitrate] p1", Dugan Ashley, 31 Jan 2024, https://odysee.com/@DuganAshley:e/ETN--erythritol-tetranitrate--p1:3

Recently new methods of erythritol have been discovered and erythritol is now mass produced. It is a consumer good sold as a zero calorie sugar replacement.
Erythritol also doesn't hurt teeth like regular sugar does.
Erythritol is probably at peak production with a very low demand, making it very cheap.
Erythritol is also a precursor for other types of explosives.
All this means that for those interested in prepping, erythritol is something to hoard and store right now. It can be used instead of sugar and it can also be converted into very strong explosives.

Make sure if buying erythritol, to buy the straight/pure erythritol, sometimes called the organic erythritol.

Du Pont De Nemours & Company had a patent for production of erythritol tetranitrate in 1928. But because of low availability of erythritol ETN was not used in either world wars. Also the wild characteristics of ETN makes it less interesting for conventional use.

ETN is an nitrate ester, which are not the most used types of explosives in conventional demolition systems. But some are commonly used like nitrocellulose (gunpowder), nitroglycerine (RPG motor) and PETN (detcord).

The explosive and sensitivity properties of ETN are very similar to PETN, the difference is essentially not noticeable on a small scale.
Both of them share the same number of nitrogen and oxygen, a factor for this is that both are nitrate esters.
ETN $C_4H_6N_4O_{12}$
PETN $C_5H_8N_4O_{12}$
But PETN has more carbon and hydrogen, which makes it more insensitive and more meta-stable.

ETN is very similar molecularly in structure to nitroglycerine. This might be less known because nitroglycerine is a liquid and ETN is a crystalline, furthermore they behave differently.
But once ETN is melted then the characteristics/behavior of ETN is very similar to that of nitroglycerine. It becomes more like a hair-trigger nitroglycerine.

The crystal density, or mass density, of ETN is 1.827 g/cc.
Experimental measurements in literature has shown that:
ETN can be pressed to have a density of 1.74 g/cc, and at this density the detonation velocity is 7900 m/s.
ETN can also be melt cast, meaning it can be melted and resolidified.
Melt cast ETN has a density of 1.69 g/cc, at this stage and density the detonation velocity is 7940 m/s
1.68 g/cc can be achieved with 27.2 GPa of pressure.

ETN is predictable or reliable in the sense that it can produce a detonation velocity around 7900 m/s at different densities, even after having been melt cast.

For comparison:
PETN with a density of 1.77 g/cc has a detonation velocity of 8300 m/s.
PETN with a density of 1.51 g/cc has a detonation velocity of 7400 m/s.

One could not tell the difference between ETN and PETN just by detonating them next to each other, unless on a very big scale.

One of the more noticeable differences in performance, which is still very slight, is the Gurney Constants. Gurney Constants is a measure of how fast explosives can projectile metal. How fast the fragmentation moves.
Gurney Constants:
TNT 1.63 km/s
ETN 1.88 km/s
PETN 2.08 km/s

Melting point of ETN is 61°C.
Decomposition and detonation temperature of ETN is 160°C.

Critical diameter of ETN is less than 3 mm, and is potentially well under 1 mm as with PETN.

Never heat ETN to its decomposition temperature anywhere close to glass or ceramics, this might cause fragmentation.

ETN's oxygen balance for CO_2 is +5.29%, meaning it is an oxidizer, which is rare amongst explosives.

ETN's pyro valence is -2. Which further shows it is an oxidizer. [he says -10 and corrects it in a later video]

The fact that ETN is an oxidizing explosive means that it can detonate with great synergy with other explosives deficient in oxygen.

ETN is also practically non-hygroscopic or insoluble in water.

Friction sensitivity:
Powdered ETN is slightly less friction sensitive than RDX.
Melt cast ETN is three times more sensitive than that of powdered ETN. Meaning melted, cooled and resolidified ETN is three times more friction sensitive than that of ETN prior to heating. Melt cast ETN is more sensitive than RDX.

There are three stages of ETN to keep in mind:
1 Powdered ETN
2 Melted ETN
3 Melt cast ETN, or resolidified ETN

Impact sensitivity:
A study tested the sensitivity of ETN and other explosives by measuring the height at which a hammer could be dropped and detonate the explosives.

Powdered ETN requires around 14.7 cm.
Melted ETN requires around 1 cm.
Melt cast ETN, or resolidified ETN, requires 12.0 cm.

Meaning, when ETN is melted, it becomes ca 14.7 times more impact sensitive. And most likely much more friction sensitive as well.
It is even more sensitive than TATP, which requires a hammer drop from 2.7 cm.

On the other hand once the ETN has cooled and resolidified then it is basically has impact sensitivity as its pre-melt phase, just more sensitive to friction.

Warning:
Whenever applying heat to ETN, be on high alert, because this is where ETN becomes many times more dangerous to handle. Then its original form that's produced.

Dugan's second video for synthesis:[41]

In this section two methods for synthesizing ETN are shown, then a procedure of purifying the ETN, which should always be done when following either method.

[writer's notes:

Both reactions should be dry, meaning no water present. And as pure acids as possible.
Sulfuric acid is used in excess both as a solvent and drying agent.

[41] "ETN part 2, synthesis, binary comps", Dugan Ashley, 28 May 2024, https://odysee.com/@DuganAshley:e/etn2:3

By method 1 for 100g of ETN:
44.2g Erythritol
91.3g or 60.4mL HNO_3 (100% conc)
182-274g or 99-149mL H_2SO_4 (100% conc)

By method 2 for 100g of ETN:
44.2g Erythritol
133.8g KNO_3
182-274g or 99-149mL H_2SO_4 (100% conc)

Back to Dugan's methods]

Method 1: Nitric Acid Method
1 Add the sulfuric and nitric acid, then place it in an ice bath.
2 Use a thermometer to keep the temperature around and under 20 degrees celsius for the duration of the synthesis.
3 Slowly add erythritol, while stirring, until it all has been added. Make sure to keep the temperature below 20 degrees celsius.
4 Once it all has been added, let it sit and fully nitrate for several hours. Preferably being mixed automatically.
5 Pour the mix into cold water, that is 10 times or more the volume of the nitric acid used. Then wait for the ETN to precipitate.
6 Filter the ETN into a cloth or coffee filter.

Method 2: Potassium Nitrate Method (nitrate salt and sulfuric acid method)
1 Add the sulfuric acid to a beaker, then place it in an ice bath.
2 Use a thermometer to keep the temperature around and under 20 degrees celsius for the duration of the synthesis.
3 Slowly add KNO_3, while stirring and breaking clumps, until it has all been added. This will create the nitric acid needed for nitration.
4 Slowly add erythritol, while stirring, until it all has been added. Make sure to keep the temperature below 20 degrees celsius.
5 Once it all has been added, let it sit and fully nitrate for several hours. Preferably being mixed automatically.
6 Pour the mix into cold water, that is 10 times or more the volume of the nitric acid used. Then wait for the ETN to precipitate.
7 Filter the ETN into a cloth or coffee filter.

Purification: (this applies to both methods and should be done)
1 Calculate the needed acetone, the amount of ETN dissolvable by ethanol is:
10 g of ETN/100 ml EtOH (=) 10ml EtOH per 1g ETN
So for each gram of ETN that is approximately being made 10 ml EtOH is needed.

2 Place the ethanol in a new beaker and heat it to circa 40-50 degrees celsius.

3 While stirring, add the ETN, and let it fully dissolve.

4 Add sodium carbonate, that is 5% the weight of the expected or desired ETN.

5 After having it stirred for 5 min, take the heat off and let it cool.

6 Pour the liquid into, 10 times the volume of the acetone used of, ice cold water. Preferably in a beaker that is in an ice bath, to keep cooling the mixture.

7 Let the ETN recrystallize and precipitate fully again before filtering it in a cloth or coffee filter.

8 Wash the ETN in the filter before collecting it and setting it to dry.

For long term storage:
It is recommended to do 2 recrystallizations, and then one ending with a crash into water and urea solution.
At minimum.
Doing more is fine, and might be needed depending on the case. It is important when trying to store ETN to keep track of it, to spot any signs of decomposition.
ETN that is decomposing needs to be recrystallized and crashed into water with (5-10% by weight) urea.

If done correctly:
ETN has a shell life of several years.

Signs of decomposition:
Acid remains cause decomposition. It can be noticed by the fact that ETN with traces of acid remains will decompose slowly, it will become yellowish around the edges.

Melt casting ETN:

AGAIN HEATING ETN IS EXTREMELY DANGEROUS.
MOLTEN ETN IS EXTREMELY SENSITIVE.

ETN is melt castable.
The melt cast of ETN has higher density and greater detonation velocity.
ETN melt density 1.69 g/cc
At this density, detonation velocity (vD) is 8.000 m/s.

Which means it is very powerful when melted.

The reason you melt ETN is to mix it thoroughly with other explosives to achieve balanced compositions. Which achieves synergy and makes greater explosive power than the two explosive materials have individually.

This will be further covered in “Compositions” in the ETN part.

But I will describe what Dugan notes in his videos. Which is that when melt casting ETN it is best to use a stand-off operation.
You conduct the operation at a distance and with a barrier to protect you in case it were to explode.

For example having a remote control to the plate melting the ETN, once it is molten turn it off, and let it cool and resolidify, meanwhile the entire time you are outside the room.
Note, make sure to not have a bunch of stuff around the ETN that will be molten, that can break or catch fire.

Just have a clear and empty space, including empty of you, where you can heat/melt and then cool down/solidify the ETN.
Whereby even if it were to explode, it would not harm anything or anyone.

One way is to use a baking glass pan and cover it with glass.
Heating this will heat the air inside it, and it resembles an oven.
Make sure it is enclosed because this helps to do an even heating of the ETN.

Then you turn on the heat.
When it is molten, or should be.
Then hit a killswitch in another place, killing the electricity to the heating source.
Let it cool down, then go in and check.

Pentaerythritol Tetranitrate (PETN)

Molar mass: 316.137 g/mol
Pyro valence: +4
Density: 1.77 g/cm^3 Detonation velocity: 8400 m/s RE factor: 1.66
Melting point: 141.3℃
Decomposition temperature: 205-225℃
Sensitivity: Medium sensitivity to shock and friction. More insensitive than ETN. More sensitive than RDX. Burns when heated with flame.

For 100g PETN using nitric acid:
43.1g Pentaerythritol
79.7g or 52.8 mL Nitric acid (100% conc)
68-137g or 37-74 mL Sulfuric acid (100% conc)

For 100g PETN using nitrate salt-sulfuric acid:
43.1g Pentaerythritol
127.9g KNO3 (or 107.6g NaNO3, or 101.3g NH4NO3)
68-137g or 37-74 mL sulfuric acid (100% conc)

Dugan says:[42]

It is similar to that of RDX. Though the precursors for RDX might be slightly easier to procure.
PETN is most suitable as base charge for a detonator. Meaning a detonator will have a primary that triggers the base charge which is the PETN.
And PETN has the brisance to trigger other explosives like nitromethane.

Tests show that in practicality pressed PETN is almost as strong as RDX. And more sensitive.

Acetone is the common solvent used to recrystallize PETN.
At 40℃ 100g acetone can hold 40g PETN.

[42] "PETN", Dugan Ashley, 3 Oct 2024, https://odysee.com/@DuganAshley:e/1001:8

At 60℃ 100g acetone can hold 50g PETN.
At 100℃ 100g acetone can hold 70g PETN.

Basically if you do 100g PETN. You need around 200g of acetone at 60℃, to dissolve it. But of course this varies depending on circumstances. And so if you need less then use less, and if you need more you use more acetone.
The goal is to fully dissolve the PETN in acetone, with ca 60℃.

There are two general methods for synthesis of PETN:
Nitric acid method and nitrate salt-sulfuric acid method.

Using high concentration (close to 100%) nitric acid has the better yield, around 95%.
You can use a nitrate salt and sulfuric acid combo, but these usually have a lower yield around 70%.

Dugan has discovered a procedure he calls “the boomer method” which does use industrial grade nitric acid (close to 70% conc) which works fine. And Dugan reportedly gets yields around 89% doing this procedure.
The instructions for the boomer method are:

Verified efficient method of preparing PETN from diluted HNO3

use
32,7 ml of 70% HNO3 (75% excess)
18,9 ml of 96% H2SO4
10,0 g of Pentaerythrite
---

or
34,0 ml of 65% HNO3 (66% excess)
24,8 ml of 96% H2SO4
10,0 g of Pentaerythrite
---

or
34,8 ml of 58% HNO3 (48% excess)
36,3 ml of 96% H2SO4
10,0 g of Pentaerythrite

Nitration:
1. Cool nitration mixture during mixing of acids, thus minimalize even minimal decomposition of HNO3. Nitration mixture must be cooled before nitration process to temperature of 10°C.
2. While stiring, add pentaerythritee in small portions (1-2g) to nitration mixture, always after previous batch is dissolved. Nitration mixture gradually thicken as PETN forming in solution.
3. Constantly monitor reaction temperature and maintain it in 10-15°C range. Interval of adding pentaerytritol conform to reaction temperature, must not rise over 15°C, leave beaker in cold water.
4. Stir with mixture for next 5 minutes after all pentaerythrite is added and dissolved. Mixture is now thick, but stirring is going well. During nitration process must not be developed any brown fumes of NOx!
5. Now put beaker with mixture into water bath and maintain temperature at 50°C, continuously stir with mixture. During 20 minutes at this temperature, all of possible sulfoesters come into PETN for maximal yield of nitration.
6. While maintaining mixture at higher temperature, mixture must be monitored for developing of NOx fumes. Only light brown colour can be in shrouded beaker. Raised development of NOx pointing to higher temperatures used (even during previous nitration) or insufficient chmemicals purity and further heating may end up in uncontrolled reaction and oxidation of formed PETN. In this case it is better to do not heat at all and end just after nitration (if brown fumes apperas during nitration), the yield will be lower. In case of accidentally runaway reaction during heating, immedialtely pour mixture into cold water, don't try stop reaction by cooling beaker, it will not help.
7. When heating after 20 minutes pass off, pour reaction mixture into cold water and follow standart procedure of filtration, neutralization and purifying of PETN.

Yield was 22,1g of PETN from 10g of pentaerythrite, ~95% of theoretical yield (with 65% HNO3 used).

This procedure is result of my research of most effective method preparing PETN from diluted HNO3. Acid ratios are precisely calculated on data from PETN nitration graph published by T. Urbanski in his book vol. IV. Generaly said, PETN is forming to maximum 30% of water portion in nitration mixture. But, when also H2SO4 is contained in nitration mixture, minimum ammount of water must be keep, or oxidation with small yields occur. With this acid ratios 20% of H2O is minimum. So, this nitration mixture has 20% of water on nitration start and 30% at the end, area for most effective nitration, but again only with this ratios. For other acid ratios must be all recalculated. Excess of HNO3 is used to controll ammount of reaction water. Only ammount of nitration mixture can be extended for lower mixture thickness, but it lower utilization of acids and overall efficiency. But it isn't necessary.

Highly recommended for the nitration to keep the reaction below 15℃. Over 20℃ can lead to a run-away.
Dugan keeps the working temperature around 5℃.
And use proper ventilation. Windows open. Fume hood.

Procedure:
1 Prepare cold sulfuric acid and nitric acid.
2 Prepare a beaker on an ice bath. Add the sulfuric acid.

3 Slowly add the nitric acid and stir. Avoid raising the temperature too much. Keep it around 15℃ at most.
4 When everything is added, stir and let it cool down to 5℃.
5 Slowly add pentaerythritol in small portions at a time, and watch the temperature. Keep it stirring.
6 When everything is added, stir with cooled temperatures for 10 min.
7 After ten min, remove the ice bath and continue stirring for another 10 min. In normal room temperature.
If the temperature rises well above room temperature it is a sign that the mixture is still not stable and needs to be put back on ice.
8 Prepare a hot water bath. Meaning a container of water which is heated. And add the reaction vessel to the water (ideally avoiding contact with the bottom of the container). Heat the water around 40-55℃. This temperature is maintained with stirring for 20 min. And greatly increases yield.
Notice however if the reaction gives signs of a runaway and produces red gas. It should be dumbed into a dumb bucket. This will cause precipitation of the PETN you have produced.
9 After 20 min you add the mixture to water. Make sure you get everything. You can also add water to the reaction vessel to help wash out the last remains.
10 Filter off the liquid. The crude PETN is in the filter, and will be very acetic.
11 Put the crude PETN back in water and wash it.
12 Filter the liquid again. Collect the PETN in the filter.
Basically perform two washes in water. You can also perform a wash with water that is 5% sodium bicarbonate. All this is to help neutralize and remove the acids from the PETN.
Having removed most of the acids is important before moving on to recrystallization.
13 Prepare a beaker of acetone. And heat it to 40-60℃. And add the PETN to the acetone. Keep it stirring and only add more acetone if needed to fully dissolve the PETN:
Dugan recommends, that once the PETN is fully dissolved, you add a few grams sodium bicarbonate to neutralize any acids trapped inside the PETN.
14 Once the PETN is fully dissolved, and the acetone is see-through. Prepare a beaker of a lot of water. Dugan uses 10% urea dissolved in 90% water mixture, again to help remove acids.
But the idea is that you add the acetone to the larger amount of water to “crash out” the PETN. To make it recrystallize. Using a lot of excess water is fine.
15 Filter and remove the liquid. The pure PETN is now in the filter.
16 Dry the pure PETN at 60℃.

Inositol Hexanitrate (IHN)

There’s really no research on inositol hexanitrate and so not much explored in this area. And so no clear information on density, detonation velocity, re factor, sensitivity, etc.
Notice also inositol is a sugar alcohol and so might share similar properties like the other nitrated sugar alcohols that are covered later.

I suggest exploring this substance but of course with caution.

The theoretical formula is:
$C_6H_{12}O_6 + 6\ HNO_3 \rightarrow C_6H_6N_6O_{18} + 6\ H_2O$

The reaction should be dry and thus using excess sulfuric acid to dry the water being produced is good.
Notice though the resulting inositol hexanitrate should have an oxidation state/pyro valence of -6.
Which is really good. Most explosives are fuels. And many oxidizers don't have this high oxidation state.

For 100g inositol hexanitrate: (theoretically)
40g Inositol
84g or 55.6mL HNO_3 (100% conc)
23.9-71.8g or 13-39mL H_2SO_4 (100% conc)

Before trying this I recommend trying a very small amount and finding the nuances. Like what the end product can be recrystallized in and what it cannot be (meaning what it reacts with).

Procedure:
1 Prepare a beaker of cold pure sulfuric acid in an ice bath.
2 Slowly add pure nitric acid. Temp below 10℃. Stir for 30 min.
3 Then let it cool before slowly adding inositol.
4 Once everything is added, stir and let it react cooled for 2 hours.
5 Keep stirring and remove the ice bath. Let it stir under room temperature for 2 hours.
6 Pour the mixture into a large amount of water.
The IHN should separate.
7 Filter the IHN and wash it in the filter a few times with water.
It likely will have traces of acid.
It would be proper to recrystallize it, and conceptually it should dissolve in acetone.
So:
8 Dissolve it in acetone. And once fully dissolved:
9 Pour it into a large amount of water again.
10 Filter and wash.
11 Dry the IHN.

Maltitol Hexanitrate (MAHN)

This is a nitrated sugar alcohol that could probably share similar properties like other nitrated sugar alcohols. But notice the information on this substance wasn't that good either.
And so proceed with extra caution trying this substance by doing small amounts first.

Formula: (hypothetical)
$C_{12}H_{24}O_{11} + 6\ HNO_3 \rightarrow C_{12}H_{18}N_6O_{18} + 6\ H_2O$
Similar as with IHN this reaction needs to be dry. As for the nitration of all sugars.
The theoretical oxidation state would be +30. Though this seems really high and it is possible that the assumed end products of the explosion can be wrong. So it might have slightly different pyro valence.

For 100g of maltitol hexanitrate:
64.5g Maltitol
70.7g or 46.8mL HNO_3 (100% conc)
20-60g or 11-33mL H_2SO_4 (100% conc)

Procedure:
1 Prepare a beaker of cold pure sulfuric acid in an ice bath.
2 Slowly add pure nitric acid. Temp below 10℃. Stir for 30 min.
3 Then let it cool before slowly adding maltitol.
4 Once everything is added, stir and let it react cooled for 2 hours.
5 Keep stirring and remove the ice bath. Let it stir under room temperature for 2 hours.
6 Pour the mixture into a large amount of water.
The MAHN should separate.
7 Filter the MAHN and wash it in the filter a few times with water.
It likely will have traces of acid.
It would be proper to recrystallize it, and conceptually it should dissolve in acetone.
So:
8 Dissolve it in acetone. And once fully dissolved:
9 Pour it into a large amount of water again.
10 Filter and wash.
11 Dry the MAHN.

Mannitol Hexanitrate (MHN)

Mannitol Hexanitrate is a nitrated sugar alcohol and might have similar properties like the others. But the information of this substance is more available.

Molar mass: 452.15 g/mol
Pyro valence: -4
Density: 1.73 g/cm^3 Detonation velocity: 8260 m/s RE factor: 1.70
Melting point: 112℃
Sensitivity: High sensitivity, but especially sensitive at temperatures above 75℃. Slightly more sensitive than nitroglycerine.
Comparable and slightly more sensitive than PETN. Slightly below the line separating primary and secondary explosives.

This is a secondary explosive which is probably what most sugar alcohols become when nitrated. Though some are more sensitive than others.

Formula:
$C_6H_{14}O_6 + 6\ HNO_3 \rightarrow C_6H_8N_6O_{18} + 6\ H_2O$

As you can see this should be an oxidizer which is useful. Though to melt cast it means going over 75℃, and so like ETN it becomes more sensitive with temperature.
A stand off operation may be best to try and perform melt cast compositions with mannitol hexanitrate.

This reaction needs to be dry as well, so use sulfuric acid, preferably in excess.

For 100g of mannitol hexanitrate:
40.3g Mannitol
83.7g or 55.4mL HNO3 (100% conc)
24-72g or 13-39mL H2SO4 (100% conc)

Procedure:
1 Prepare a beaker of cold pure sulfuric acid in an ice bath.
2 Slowly add pure nitric acid. Temp below 10℃. Stir for 30 min.
3 Then let it cool before slowly adding mannitol.
4 Once everything is added, stir and let it react cooled for 2 hours.
5 Keep stirring and remove the ice bath. Let it stir under room temperature for 2 hours.
6 Pour the mixture into a large amount of water.
The MHN should separate.
7 Filter the MHN and wash it in the filter a few times with water.
It likely will have traces of acid.
It would be proper to recrystallize it, and conceptually it should dissolve in acetone.
So:
8 Dissolve it in acetone. And once fully dissolved:
9 Pour it into a large amount of water again.
10 Filter and wash.
11 Dry the MHN.

Sorbitol Hexanitrate (SHN)

Pyro valence: -4
Melting point: 55℃

Formula:
$C_6H_{14}O_6 + 6\ HNO_3 \rightarrow C_6H_8N_6O_{18} + 6\ H_2O$
Reaction needs sulfuric acid as a drying agent and solvent.
SHN should have -4 pyro valence.

For 100g of sorbitol hexanitrate:
40.3g Sorbitol
83.7g or 55.4mL HNO3 (100% conc)
24-72g or 13-39mL H2SO4 (100% conc)

Procedure:
1 Prepare a beaker of cold pure sulfuric acid in an ice bath.
2 Slowly add pure nitric acid. Temp below 10℃. Stir for 30 min.
3 Then let it cool before slowly adding sorbitol.
4 Once everything is added, stir and let it react cooled for 2 hours.
5 Keep stirring and remove the ice bath. Let it stir under room temperature for 2 hours.
6 Pour the mixture into a large amount of water.
The SHN should separate.
7 Filter the SHN and wash it in the filter a few times with water.
It likely will have traces of acid.
It would be proper to recrystallize it, and conceptually it should dissolve in acetone.
So:
8 Dissolve it in acetone. And once fully dissolved:
9 Pour it into a large amount of water again.
10 Filter and wash.
11 Dry the SHN.

Xylitol Pentanitrate (XPN)

Molar mass: 377.131 g/mol
Pyro valence: -3
Density: 1.852 g/cm^3 Detonation velocity: 7100 m/s
Melting point: 45.5℃
Sensitivity: extremely sensitive, it has primary sensitivity.

Formula:
$C_5H_{12}O_5 + 5\ HNO_3 \rightarrow C_5H_7N_5O_{15} + 5\ H_2O$

For 5g product: (using sulfuric acid)
2.02 g Xylitol
4.18 g or 2.77 mL HNO_3 (100% conc)
1.2-3.6 g or 0.65-2 mL H_2SO_4

For 5g product: (using glacial acetic acid)
2.02 g Xylitol
4.18 g or 2.77 mL HNO_3 (100% conc)
1.2-3.6 g or 1-2 mL Glacial acetic acid

For 5g product: (using acetic anhydride)
2.02 g Xylitol
4.18 g or 2.77 mL HNO_3 (100% conc)

6.8-20.3 g or 6.3-18.8 mL Acetic anhydride

There are three combinations basically. Darian Ballard has a video discussing this and performing the synthesis. The recipe he found using acetic anhydride had a yellow end product which was suspect.
Using nitric acid and sulfuric acid is the old method.
But Darian discovered you can use glacial acetic acid only. The idea is that you prepare nitric acid with glacial acetic acid first. Because pure glacial acetic acid will freeze when on an ice bath.[43]

Nitration of xylitol is extremely exothermic. And xylitol pentanitrate is a primary. So naturally you should only prepare at most 5g at a time. Preferably less.
Because the reaction and the compound both are sensitive. The reaction easily heats up and the compound is sensitive to detonate.

Procedure:
Prepare nitric acid on an ice bath. And slowly add the acid (glacial acetic acid, sulfuric acid or acetic anhydride, whichever you use). Keep the temperature below 10℃, ideally around 5℃. And stir.

Then slowly add the xylitol and do mind the temperature because this reaction in particular is extremely exothermic.
Once finished, let it react while stirring and cooled for 2 hours. Then remove the ice bath and let it stir and react for 2 hours at room temperature.

Put the reaction vessel in the refrigerator and let the XPN settle at the bottom.
[Darian adds acetic anhydride here to help precipitate the XPN, though it is unclear if acetic anhydride is needed. He mentions the vacuum chamber being the important step in extracting the XPN dry]

Once settled, decant as much as possible and place the XPN mixture in a vacuum chamber for 3 days.

Then dissolve the XPN in just enough toluene. If unclean, you can separate the visibly dirty bottom layer with a separatory funnel.
And then gently evaporate the toluene with a hot water bath.
Meaning you place the toluene solution beaker in hot water heated enough to evaporate the toluene.

Recommended to pour the last wet XPN crystals on a flat plastic plate. The idea is to have minimum friction when you scrape off the XPN crystals.
So let it do its final drying by air evaporation by pouring it on a flat plastic surface.
And once dried and fully crystalized you scrape it off.

[43] "XPN xylitol pentanitrate #chemistry #science", Darian Ballard, 12 Feb 2024
https://www.youtube.com/watch?v=g5sLY9wrzms

Ethylene Glycol Dinitrate (EGDN)

Molar mass: 152.1 g/mol
Pyro valence: 0
Density: 1.49 g/cm^3 Detonation velocity: 8300 m/s RE factor: 1.66
Melting point: -22℃
Sensitivity: High sensitivity. Burns strongly when touched by fire. When heated rapidly to 215°C it explodes.
Don't press for increased density. Never press liquid explosives.

Liquid explosive

Formula:
$C_2H_6O_2$ (ethylene glycol) + 2 HNO_3 (nitric acid) → $C_2H_4N_2O_6$ (EGDN) + 2 H_2O

This reaction can be done using diluted reactants. According to wikipedia:
"Direct Nitration of Glycol is carried out in exactly the same manner, with the same apparatus, and with the same mixed acids as nitration of glycerine. In the test nitration of anhydrous glycol (100g) with 625g of mixed acid HNO_3 40% & H_2SO_4 60% at 10-12°, the yield was 222g and it dropped to 218g when the temp was raised to 29-30°. When 500g of mixed acid HNO_3 50% & H_2SO_4 50% was used at 10-12°, the yield increased to 229g. In commercial nitration, the yields obtained from 100 kg anhydrous glycol and 625 kg of mixed acid containing HNO_3 41%, H_2SO_4 58% & water 1% were 222.2 kg of NGc at nitrating temp of 10-12° and only 218.3 kg at 29-30°." [44]

For 100g EGDN: (pure reactants)
40.85g Ethylene glycol
82.90g Nitric acid
64.50g Sulfuric acid
(use this if you need to calculate for different concentrations)
(first divide by concentration, this gives the weight) (if you want volume, then secondly divide by density)
(density:
Ethylene glycol (50%) 1.06 g/mL
Nitric acid (70%) 1.41 g/mL (50%) 1.20g/mL
Sulfuric acid (70%) 1.67 g/mL (50%) 1.40g/mL (30%) 1.23g/mL)

[44] "Ethylene glycol dinitrate", Wikipedia, 13 Feb 2025, https://en.wikipedia.org/wiki/Ethylene_glycol_dinitrate

For 100g EGDN: (using industrial grade nitric and sulfuric acid, with anti freeze)
81.70g or 77mL Ethylene glycol (conc 50%)
118.43g or 84mL Nitric acid (conc 70%)
92.14g 55mL Sulfuric acid (conc 70%)

The resulting product is:

100g or 66.7mL EGDN	29%
127.7g or 127.7mL Water	56%
64.5g or 35mLSulfuric acid	15%
Total 292.2g or 229.4mL	100%

For 100g EGDN: (using industrial grade nitric, battery acid grade sulfuric acid, with anti freeze)
81.70g or 77mL Ethylene glycol (conc 50%)
118.43g or 84mL Nitric acid (conc 70%)
215.0g or 174.8mL Sulfuric acid (conc 30%)

The resulting product is:

100g or 66.7mL EGDN	19%
250.6g or 250.6mL Water	71%
64.5g or 35mLSulfuric acid	10%
Total 415.1g or 352.3mL	100%

Procedure:
1 Prepare sulfuric acid on an ice bath and cool it below 10℃.
2 Slowly add nitric acid, stir and keep the temp below 10℃.
3 Once added and cooled, slowly add the ethylene glycol. Stir while watching the temperature.
4 Once everything was added let it react for 2 hours under cooling and stirring.
5 Then take it off of the ice bath and let it sit for another 2 hours in room temp. Stop the stirring and let the EGDN liquid precipitate.
6 The EGDN precipitates as a liquid bottom layer separate from the water. This allows you to decant off most of the water.
7 Wash the EGDN with sodium bicarbonate 5% solution, to neutralize excess acids. And then decant off most water again.
8 Let it air dry normally.

General notes: Liquid explosives are more likely prone to decomposition over time. Meaning it is less safe and useful to store compared to other explosives. And so liquid explosives are more suited for short term storage.
Liquid explosives should be kept away from heat and metal. Nitroglycerine is famously known to be detonated by hitting it with a hammer. And the strike doesn't require enormous force.
And since liquid explosives have general similarities I recommend extra caution in handling and storing liquid explosives. Some similarities being more sensitivity, more prone to decompose, and stronger explosive power.
Keep them in dry, cold, and dark places, away from metal, heat and other explosives.
And do not press them for density. Enclosed spaces and confinement is enough to detonate these.

Propylene Glycol Dinitrate (PGDN)

Molar mass: 166.089 g/mol
Pyro valence: +6
Density: 1.232 g/cm^3
Melting point: -27.7℃
Sensitivity: High sensitivity. Burns strongly when touched by fire. Decomposes at 197°C.

It is structurally similar to nitroglycerine and likely shares similar high power and sensitivity of other liquid explosives.

Formula:
CH3-CHOH-CH2OH (propylene glycol) + 2 HNO3 → CH3-CH(ONO2)-CH2ONO2 (propylene glycol dinitrate) + 2 H2O

For 100g PGDN: (pure reactants)
45.82g Propylene glycol
75.88g Nitric acid
5.90g Sulfuric acid
(density:
Propylene glycol (50%) 1.04 g/mL
Nitric acid (70%) 1.41 g/mL (50%) 1.20g/mL
Sulfuric acid (70%) 1.67 g/mL (50%) 1.40g/mL (30%) 1.23g/mL)

For 100g PGDN: (using industrial nitric and sulfuric acid, and propylene antifreeze)
91.63g or 88.45mL Propylene glycol (50%)
108.40g or 76.88mL Nitric acid (70%)
8.44g or 5.24mL Sulfuric acid (70%)

For 100g PGDN: (using industrial nitric, battery acid sulfuric acid, and propylene antifreeze)
91.63g or 88.45mL Propylene glycol (50%)
108.40g or 76.88mL Nitric acid (70%)
19.68g or 16.15mL Sulfuric acid (30%)

Procedure:
1 Prepare sulfuric acid on an ice bath and cool it below 10℃.
2 Slowly add nitric acid, stir and keep the temp below 10℃.
3 Once added and cooled, slowly add the propylene glycol. Stir while watching the temperature.
4 Once everything was added let it react for 2 hours under cooling and stirring.
5 Then take it off of the ice bath and let it sit for another 2 hours in room temp. Stop the stirring and let the PGDN liquid precipitate.
6 The PGDN precipitates as a liquid bottom layer separate from the water. This allows you to decant off most of the water.
7 Wash the PGDN with sodium bicarbonate 5% solution, to neutralize excess acids. And then decant off most water again.
8 Let it air dry normally.

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Diethylene Glycol Dinitrate (DEGDN)

Molar mass: 196.115 g/mol
Pyro valence: +10
Density: 1.3846 g/cm^3 Detonation velocity: 6610 m/s RE factor: 1.17
Melting point: -11.5℃
Sensitivity: High sensitivity. Decomposes at 121°C. Pure DEGDN is difficult to ignite, requiring heating to the point of decomposition.
Shock sensitive but not very friction sensitive.

Liquid explosive

Formula:
C4H10O3 (diethylene glycol) + 2 HNO3 → C4H8N2O7 (diethylene glycol dinitrate) + 2 H2O

For 100g DEGDN: (pure reactants)
55.21g Diethylene glycol
65.56g Nitric acid
5.11g Sulfuric acid

For 100g DEGDN: (using industrial grade nitric acid and sulfuric acid, DEG antifreeze)
110.42g or 105.16mL Diethylene glycol (50%)
93.65g or 66.42mL Nitric acid (70%)
7.30g or 4.53mL Sulfuric acid (70%)

For 100g DEGDN: (using industrial grade nitric acid, battery acid sulfuric acid, DEG antifreeze)
110.42g or 105.16mL Diethylene glycol (50%)
93.65g or 66.42mL Nitric acid (70%)
17.03g or 13.98mL Sulfuric acid (30%)

Procedure:
1 Prepare sulfuric acid on an ice bath and cool it below 10℃.
2 Slowly add nitric acid, stir and keep the temp below 10℃.
3 Once added and cooled, slowly add the diethylene glycol. Stir while watching the temperature.
4 Once everything was added let it react for 2 hours under cooling and stirring.
5 Then take it off of the ice bath and let it sit for another 2 hours in room temp. Stop the stirring and let the DEGDN liquid precipitate.
6 The DEGDN precipitates as a liquid bottom layer separate from the water. This allows you to decant off most of the water.

7 Wash the DEGDN with sodium bicarbonate 5% solution, to neutralize excess acids. And then decant off most water again.
8 Let it air dry normally.

General notes: Liquid explosives are more likely prone to decomposition over time. Meaning it is less safe and useful to store compared to other explosives. And so liquid explosives are more suited for short term storage.
Liquid explosives should be kept away from heat and metal. Nitroglycerine is famously known to be detonated by hitting it with a hammer. And the strike doesn't require enormous force.
And since liquid explosives have general similarities I recommend extra caution in handling and storing liquid explosives. Some similarities being more sensitivity, more prone to decompose, and stronger explosive power.
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And do not press them for density. Enclosed spaces and confinement is enough to detonate these.

Hexamine and its derivatives:

Hexamine

Hexamine, also known as:
Hexamethylenetetramine
Methenamine
Urotropine
Formin
Aminoform
HMTA

Historically hexamine has been used as an emergency firestarter.
As it burns very clean without any smoke.
Note however the burning vapors are toxic.
Hexamine also has a high energy density.

Hexamine has also been used as a preservative for food.
And as a medication to treat urinary tract infection.

Hexamine has also been a component and precursor for explosives production.
Most notably it is the primary component used to produce RDX.

To synthesize hexamine is quite easy and safe.
Just react formaldehyde with ammonia.

Note that it is important, or beneficial, to use excess ammonia.

Excess ammonia is beneficial for two reasons:
1 The extra ammonia helps make a more stable end product of hexamine.
2 It means that all the formaldehyde has reacted. Which is good because formaldehyde is toxic and corrosive.
So the mixture is generally safer and more stable with excess ammonia.

The reaction is exothermic.
On small scales it is generally safe to just mix the two reactants immediately.
On a larger scale it could be done in small and slow proportions to exercise some temperature control if needed.

Formula:
6 HCHO (formaldehyde) + 4 NH_3 (ammonia) → $C_6H_{12}N_4$ + 6 H_2O

Formaldehyde:
Molar mass: 30.026 g/mol
Density at 40% conc: 1.09 g/mL

Ammonia:
Molar mass: 17.031 g/mol
Density at 10% conc: 0.96 g/mL

For 100g hexamine: (pure reactants)
128.51g Formaldehyde
48.59g Ammonia

For 100g hexamine: (conc 40% formaldehyde, 10% ammonia, commercial solutions)
321g or 295mL Formaldehyde (conc 40%)
486g or 506mL Ammonia (conc 10%)
(Using 1-2% excess ammonia in this case would mean using ca 5-10mL extra ammonia solution, so around 510-515mL ammonia solution, greater excess can of course be used.)

Procedure:[45]

1 Add the formaldehyde to the beaker.
2 Add the ammonia and stir with the glass rod.
Make sure to use an excess amount of ammonia

[45] "Making Hexamine", Apoptosis, 1 Sep 2023, https://www.youtube.com/watch?v=SYOze014tW0

Add slowly if for whatever reason the temperature from this exothermic reaction is a problem.
3 Let the reaction sit for a few minutes while stirring.
The reaction produces mainly hexamine and water, with any excess ammonia solution you used.
4 Put the beaker on the hot plate, and bring it to a boil. To evaporate the water. This will precipitate the hexamine.
Boiling off all of the water might lead to completely dry hexamine which might get burned a little by the heat.
So be mindful of not burning the hexamine as it precipitates out and becomes dry.
One could also boil off most water leaving a little damp hexamine, then letting the hexamine air dry.
Note: Ammonia is a gas, so it will evaporate away with the water. Leaving pure hexamine behind.
You can also dry the hexamine in the oven, after having boiled off most of the water. Just be mindful not to burn the hexamine.

RDX

Molar mass: 222.117 g/mol
Pyro valence: 0
Density actual: 1.806 g/cm^3
Density: 1.78 g/cm^3 Detonation velocity: 8600 m/s RE Factor: 1.60
Melting point 205.5°C.
Boiling point 234°C
Insoluble in water
Sensitivity: low for heat, friction and shock.

Dugan says in part 1 and 2 of RDX:[46] [47]

RDX, is an abbreviation for “Research Department eXplosive”, which is an old code name Britain adopted for the explosive during World War II.
RDX is also known as, cyclonite, hexogen, hexolite, trimethylenetrinitramine and cyclotrimethylenetrinitramine.
In some research papers it may be referred to as:
1,3,5-Trinitro-1,3,5-triazinane
1,3,5-Trinitroperhydro-1,3,5-triazine
1,3,5-Trinitro-1,3,5-triazacyclohexane
1,3,5-Trinitrohexahydro-s-triazine
Hexahydro-1,3,5-trinitro-s-triazine

[46] “How to make RDX, overview [part 1 of 2]”, Dugan Ashley, 31 Jan 2024, https://odysee.com/@DuganAshley:e/RDX--part-1-of-2-:b
[47] “How to make RDX [part 2 of 2]”, Dugan Ashley, 31 Jan 2024, https://odysee.com/@DuganAshley:e/RDX-Synthesis--part-2-of-2-:c

RDX was first reported in 1898 by Georg Freidrich Henning, who obtained a German Patent for its manufacture by nitrolysis of hexamine, with concentrated nitric acid.
Later somewhere around 1921 is when the explosive powers of RDX started to be investigated. Edmund Herz and Friedrich Lenz were important figures in the research for Germany. Meanwhile Dr. George C Hale was concurrently working on it in the United States.
Then immediately prior to World War 2 most major nations had devised processes for the production of RDX.

PETN has the precursors acetyldehyde and formaldehyde.
RDX had the precursors ammonia and formaldehyde.
Even though both have approximately the same explosive power, RDX quickly replaced PETN. The reason being that it was much easier to produce RDX in large quantities than PETN, which has the precursor acetaldehyde, which is hard to produce in mass quantities.

RDX is also found in detonators, but those are generally less effective than the PETN-based detonators, since PETN is more efficient than RDX in smaller payloads. PETN is also more sensitive than RDX, thus it's easier to trigger PETN detonators.
PETN critical diameter is < 1 mm.
RDX critical diameter is >1 mm. (it is generally considered to be 1 mm or slightly above)

RDX is known to be a very stable explosive.
It is able to withstand 120°C for 62 hours, without having any acidic decomposition products.

RDX is three times more sensitive than TNT.

RDX becomes twice as sensitive when heated to 100°C.

Density affects the explosive power of RDX, more tightly packed RDX the more explosive:
Density of 0.8 g/cc, gives a detonation velocity of 5000 m/s.
Density of 1 g/cc, gives a detonation velocity of 6000 m/s.
Density of 1.7 g/cc, gives a detonation velocity of 8300 m/s.

Theoretically highest density of RDX: 1.806 g/cc.
Theoretically highest detonation velocity of RDX: 8800 m/s.

The equation for detonation velocity:
D = Detonation velocity
p = density
D = 2.56 + 3.47 * p (this gives the answer in the form of km/s)
D = 2560 + 3470 * p (this gives the answer in the form of m/s)

1.767 g/cc
33.8 GPa

Melting point of RDX: 202-207°C
Temperature for detonation of RDX: 229°C

RDX can be almost entirely desensitized by water. A composition of 85% RDX and 15% water can withstand a number 6 blasting cap.

Generally all secondary explosives should be recrystallized 3 times.
This includes RDX.

RDX is effectively dissolved in acetone at 56°C (which is close to boiling point). At this temperature 15.27g of RDX can be dissolved into 100 g of acetone.

Hexamine is the raw precursor that reacts with nitric acid to make RDX.
Hexamine dinitrate (HDN) is a product that can be generated when mixing hexamine and low concentration nitric acid (68% or lower).
Hexamine dinitrate is a white crystal/powder and a very weak explosive.
Nitration of hexamine dinitrate will also yield RDX.
Therefor two routes are possible for RDX production:
1 Nitrate hexamine directly to RDX. (one stage process)
2 Nitrate hexamine to hexamine dinitrate, then nitrate hexamine dinitrate to RDX. (Two stage process)

Route 1 consists of one slow nitration and route 2 consists of two fast nitrations.
The reason for this is that the mixtures need to be kept cool, and the nitration of hexamine to RDX is twice as exothermic than the nitration of hexamine dinitrate to RDX. Meaning that nitrating hexamine to RDX produces twice as much heat and therefore needs to be done slower to prevent temperature build up.

Route 1 is faster, because the slow nitration is still faster than the two fast nitrations together. Although both are viable routes for RDX production. And there's no advantage in terms of yield.

Hexamine is formed by the condensation of formaldehyde and ammonia. (mix)
Formaldehyde is formed by catalytic oxidation of methanol. (pass methanol vapor over hot platinum wire).
Ammonia is formed by reacting nitrogen gas (from the atmosphere) and hydrogen gas (from electrolysis of water).

Most common routes for RDX will yield between 75-80%; 110-119 kg of RDX can be obtained from 100 kg of hexamine.

Hale and Bachman process can be used to synthesize hexamine dinitrate. This is the literature route of producing hexamine dinitrate.

It is also possible to use "the dump method", whereby all of the nitric acid is dumped in at once. This causes a quick and almost immediate precipitation of hexamine dinitrate. Problem is that this will exceed

the recommended temperatures and could cause some contaminate products and methylene products. These contaminants may decrease the yield. On top of that the hexamine dinitrate is less stable than if it were produced the literature route.

All routes to produce RDX lead to 8-12% by mass side product called HMX. With the exception of the "nitrosation-method" that does produce pure RDX, but is not recommended because it produces less and weaker RDX.

There are ways to turn the RDX route into a route that produces almost pure HMX instead. The reason to do this might be because HMX has stronger explosive power. But it does require more time and resources, to execute the more complicated route.

Lastly, the recommended route for RDX production is the "K-method" or the "Knöffler method", and Dugan's RDX recipe, is a variant of the K-method.
This is the recommended method because it has no risk of detonation, followed correctly, and it increases the yield, at the expense of some ammonium nitrate, it can also consistently produce RDX with a good yield between 80-90%.

So it's the cheapest, safest and most yielding method.
This is the absolute best way to produce RDX, if one would try to produce RDX any other route, they should add ammonium nitrate to that process, to minimize the risk of explosion and increase yield.

Notice: All standard procedures to produce RDX includes a heating of the nitration mixture. Some procedures heat it to 50°C, some heat to 70°C, but the recommended K-method heats to 80°C.
So the mixture needs to be very slowly and cautiously heated to 80.
The reason for this is that the RDX produced from nitration has contaminates that bring with it a risk of explosion. These contaminants can be decomposed, destroyed and removed by heat. This happens somewhere over 50°C.
Furthermore when doing the K-method it is important to heat to 80°C specifically, because it is at this heat the second reaction takes place which will give yield upwards of 90%, which is very good compared to the standard 70%.
Anytime a RDX nitration mixture is heated above 25°C then there's a risk of explosion, except when using the K-method, this heating is much safer and the only threat is a runaway reaction.
A runaway reaction can be noticed by red fumes being emitted, and it can be avoided by dumping the mixture completely into water.

Summary: Use the K-method:
Nitration of hexamine, with a nitric acid and ammonium nitrate mixture. Keep it under 15°C.
When all hexamine has been absorbed into the mixture, take it off the ice, when it reaches room temperature, hold it for 30 min, then start heating it slowly and cautiously, to 80°C and hold it there for 30 min. Then take it off heat.
If at any time during the process you see red fumes being emitted, dumb it.

One stage processes:

Dugan's RDX Recipe (K-method):

Overview:
Hexamine 1 mol
Ammonium Nitrate 2 mol
Nitric Acid [100%] 8.6x w/w of Hexamine

Standard k-method uses about 8.6 g of nitric acid per 1 g of hexamine.

For this reaction it is important to use as pure nitric acid as possible, it is recommended to use nitric acid with a concentration above 90%.

Ratio of reactants by weight:
Hexamine 1 g
Ammonium Nitrate 1.14 g
Nitric Acid [100%] 8.6 g

If one is not using 100% pure nitric acid, then it's needed to calculate how much diluted nitric acid corresponds to the needed nitric acid.

a_s = acid solution
c = concentration
a_p = pure acid
$a_s * c = a_p$
$a_s = a_p / c$

So to calculate the needed amount of diluted nitric acid, divide the needed amount of pure nitric acid with the concentration of the diluted nitric acid.

Example:
1 kg of hexamine and 95% nitric acid is to be used.
1000 * 8.6 = 8600 (needed amount of pure nitric acid)
8600/0.95 = 9052.631… ~ 9053 (g) (needed amount of diluted nitric acid)
So 9.053 kg of 95% nitric acid is needed for 1 kg of hexamine.

This reaction also works with hexamine dinitrate instead of hexamine, also the addition of hexamine dinitrate is less exothermic and can therefore be done a little faster.

Procedure:

1 Weigh out the nitric acid and put it in a glass vessel.

2 Add a thermometer and stirring bar to the vessel.

3 Prepare an ice bath for the vessel. Use a lot of ice and regular salt (sodium chloride) and water.

4 Start the stirring bar and add the ammonium nitrate to the nitric acid.

5 Let the ammonium nitrate fully dissolve and then let the entire mixture cool down again. Make sure the temperature goes all the way down to 0°C before any addition of hexamine.

6 Once the temperature is 0°C, start adding the hexamine very slowly, monitoring the temperature, to make sure it does not rise too high. The temperature should not rise above 15°C, if that happens you will run into a runaway reaction. You can tell that a runaway is going to happen when the temperature keeps rising on its own, and red fumes start appearing.
The addition of hexamine is safe, but it may take a long time to add. If for whatever reason you see red gas, then dump the reaction.
In this case it would be best to have a bucket with enough water to fully and completely submerge the entire vessel, close-by. To effectively dump the mixture if needed.

7 Once all the hexamine is in, let it sit and stir for a bit, while you monitor the temperature, watch it to make sure it’s stable.

At this point RDX is produced, but it still has contaminants. These contaminants are problematic as they introduce instability to the RDX, increasing the risk of explosion. These contaminants are removed by heat. This happens somewhere over 50°C.
But using this method, the K-method, the mixture should be heated to 80°C. The reason for this is that this will allow the second reaction where you produce 2 moles RDX per 1 mole of hexamine. Achieving this reaction, by reaching 80°C and holding it for 30 min, will increase the yields to 90%, which is better than the average 70%.
Because of the added ammonium nitrate there’s no threat of spontaneous explosion. The only threat is a runaway reaction. A runaway reaction can be noticed by red fumes being emitted, and it can be avoided by just dumping the product completely into water.
If one does dump the product somewhere in the process after all the hexamine was added, then RDX will precipitate in the water which can be collected.
So during the heating process, if one reaches 50°C, but not 80°C, then they would have removed the contaminants, but only reached the standard yield of 70%.

If one is unsure if there's a slight hint of red fumes, the best thing would be to put it back on ice, then wait and see if it needs to be dumbed.

Remember to always keep an eye on the mixture and the temperature. The mixture cannot explode spontaneously from the heat, the only danger is just to avoid a potential runaway reaction, which can be noticed by the red fumes, and avoided by dumping the entire vessel into water.

8 Take the vessel off of the ice and let it rise to room temperature, keep the stirring bar on. Monitor this step carefully.

9 Once the mixture reaches room temperature, let it sit and stir for 30 min.

10 After 30 min, put the vessel in water and then very slowly and cautiously raise the temperature, 5 degrees at a time if needed. Until you reach 80°C.

11 Once the mixture reaches 80°C, let it sit and stir for 30 min.

12 After these 30 min, turn off the heat and let the reaction cool down to 20°C. This can be done faster by putting the vessel back on ice.

The temperature of 80°C for 30 min is crucial to achieve the 90% yield. It is under these conditions the second reaction takes place, whereby you get 2 moles RDX per 1 mole of hexamine. Also heating the mixture above 50°C is important to decompose/destroy unwanted side products.

13 Once the temperature reaches 20°C, pour the entire mixture into water, preferably ice cold water. This will cause the RDX to precipitate.

14 Pour the RDX precipitate and the liquid mixture through a filter.

15 Prepare a sodium carbonate or sodium bicarbonate wash. Mix sodium carbonate either/or sodium bicarbonate with water, the mixture should be 5% by weight sodium carbonate or sodium bicarbonate.

16 Wash the crude RDX in the filter with the sodium carbonate wash. This will remove acidic residuals.

17 Let the crude RDX dry and then weigh it.

18 Prepare a beaker with acetone and a stirring bar. You need 100 ml of acetone per 15 grams of RDX.

19 Heat the acetone close to its boiling point of 56.08°C, with the stirring bar on, then add the RDX, make sure it fully dissolves, if it doesn't add more acetone.

20 Once the acetone is clear and all the RDX is dissolved, take it off heat and then pour the mixture into water. This will precipitate recrystallized RDX.

21 Pour the RDX into a new filter.

22 It is recommended to repeat the steps 14-21, three times. Meaning to repeat the filtering, washing with sodium carbonate wash and the recrystallization in acetone, three times.
This will give pure RDX.

RDX can be desensitized and plasticized with wax and/or teflon powder/PTFE powder. Even as low as 2% by weight.

Knöffler Method/K-Method

$C_6H_{12}N_4 + 2\ NH_4NO_3 + 4\ HNO_3 \rightarrow 2\ (CH_2N{*}NO_2)_3 + 6\ H_2O$

This method has a good yield of 80-90%.

This is the recommended method for homemade RDX.

It does not have any risk of detonation, followed properly. This is due to the added ammonium nitrate.

The added ammonium nitrate also increases yield.
The added ammonium nitrate can replace some of the hexamine in the reaction, this way less hexamine and more ammonium nitrate is used, for the same yield. This is good because ammonium nitrate is abundant in availability, so one can save up on the hexamine for later synthesis. Meaning more RDX per hexamine at the expense of some ammonium nitrate.
Notice: however ammonium nitrate can not fully replace hexamine, because a certain ratio of hexamine is required for the reaction.

This is the absolute best way to produce RDX, if one would try to produce RDX any other route, they should add ammonium nitrate to that process, to minimize the risk of explosion and increase yield.

British Method

For each gram of RDX, needed chemicals are:
0.833 g of hexamine
8.779 g Nitric Acid
0.490 g Sulfuric Acid
[notice sulfuric acid decomposes hexamine, so there's probably a very important order or procedure to mix the reactants in this method.]

The same ratios apply for kg:

For each kg of RDX, needed chemicals are:
0.833 kg of hexamine
8.779 kg Nitric Acid
0.490 kg Sulfuric Acid

German Method/SH-Method/SH-Salz

For each gram of RDX, needed chemicals are:
0.880 g Hexamine
6.800-7.760 g Nitric Acid [99%]

The same ratios apply for kg:

For each kg of RDX, needed chemicals are:
0.880 kg Hexamine
6.800-7.760 kg Nitric Acid [99%] (to help achieve such high concentration, sulfuric acid can be used)

Wolfram Method/W-Salz/W-Method

This method has good yield but has hard to obtain precursors and is not recommended.
So this is more for information's sake.

“A method for the preparation of cyclonite from sulphamic acid, formaldehyde and nitric acid was developed in 1934 by Wolfram… The W-method is based on the condensation of the potassium salt of sulphamic acid with the formaldehyde and the nitration of the condensation product (“white salt”, a Schiff’s base of the type XVIII) with nitric acid.”

This reaction is able to achieve yields in the 80-90% range.

E-Method

“In this process paraformaldehyde and ammonium nitrate undergo dehydration under the influence of acetic anhydride with the formation of cyclonite according to the equation:

$3\ CH_2O + 3\ NH_4NO_3 + 6\ (CH_3CO)_2 \rightarrow (CH_2N{*}NO_2)_3 + 12\ CH_3COOH$”

KA-Method

This method uses:

400 kg of hexamine
430 kg of ammonium nitrate
680 kg of 99% nitric acid
2400 kg of acetic acid (as anhydride)

This method usually has yields around 70-71%, which is low.

The Nitrosation Route

This reaction uses:
Hexamine
Sodium Nitrate
Muriatic Acid

The advantage of this route is that it produces pure RDX and no HMX side product. The disadvantages are that less RDX is produced and it is less powerful. It can be oxidized with nitric acid and hydrogen peroxide to make it more powerful. But this process is still very unexplored and not recommended.

The procedure would be to prepare sodium nitrate and muriatic acid on an ice bath.
Slowly adding hexamine.
And then crashing out the product in water.

Two Stage Process:

Part 1: Hexamine Dinitrate Synthesis: Hale and Bachman Process:

Molar ratio: Hexamine:nitric acid 1:2
The standard route uses:
20 g Hexamine
35 ml Water
27.6 g Nitric Acid (65% concentration)

For the extraction:
100 ml Acetone

1 mix 20 g of hexamine and 35 ml of water.
2 Cool this down to 0-5°C with an ice bath and use a stir bar to fully dissolve the hexamine in the water.
3 Once the hexamine is fully dissolved, add the nitric acid dropwise, make sure the temperature stays under 10°C.
4 When all the nitric acid has been dropped in, let the reaction stir for 15 min. This will precipitate hexamine dinitrate.

Extraction:
5 Take the solution and pour it through a coffee filter.
6 Wash it with 100 ml of acetone
7 Take the filter with the hexamine dinitrate and place it in a cool place to air dry.
8 Once the hexamine is moist and no longer wet, take the filter with the hexamine dinitrate and place it on top of silica gel in a bag. This will absorb the last traces of moisture (water and acetone).
9 Once dry, it is ready to be collected.

Don't assist the drying process with heat. Hexamine dinitrate is sensitive to heat and could decompose into nitric acid. This will be apparent if there's fissing and an acidic smell.

This will yield 86-98% of the theoretical value for hexamine dinitrate.

To upscale the process based on desired amount of product use the ratios:
1 g Hexamine
1.75 ml Water
1.38 g Nitric Acid [65%]
5 ml Acetone

(multiply each reactant with the desired amount of hexamine in grams)
(using excess nitric acid increases yield according to Turhan 2013)[48]

Table 1. Effect of an excess amount of HNO_3 on the reaction yield.

Sample	Stoichiometry[a]/mol	Yield/wt-%	HNO_3 content/wt-%
H1	1.0/2.0	85.67	47.10
H2	1.0/2.2	90.15	47.31
H3	1.0/2.4	95.77	47.62
H4	1.0/2.6	96.93	47.50
H5	1.0/2.8	97.80	47.52
H6	1.0/3.0	97.46	47.50

a) Mol hexamine/mol HNO_3.

Part 2: RDX synthesis: Nitration of Hexamine Dinitrate:

[48] "Hexamethylenetetramine Dinitrate (HDN): The Precursor for RDX Production by Bachmann Process", Turhan and co, 2013, https://www.wellesu.com/10.1002/prep.201200162

Same molar ratio: Hexamine dinitrate:Nitric acid 1:2

Using excess and stronger concentrated nitric acid yields more and stronger RDX.
Adding extra ammonium nitrate, like a “k-method” variation, helps yields and makes it safer.

Molar mass of hexamine dinitrate is: 266.214 g/mol

Procedure:
1 Cool nitric acid below 10C. (Add sulfuric acid if you use it). (Add the ammonium nitrate if you use it)
2 Once prepared, having been cooled below 10C, slowly add hexamine dinitrate.
3 Once everything is added. Stir cooled for 30 min.
4 Take off the ice bath. Stir under room temperature for 30 min.
5 Raise the temperature to 80C and hold it for 30 min, under stirring.
Then let it cool down again.

HMX

Molar mass: 295.155 g/mol
Melting point: 276-286°C
Pyro valence: 0
Density 1.86 g/mol Detonation velocity: 9100 m/s RE factor: 1.70
Sensitivity: Friction, heat and shock sensitivity is low. But it is slightly more sensitive than RDX.
Can explode violently when heated to 278°C. Meaning attempting to melt cast HMX is dangerous, don’t try it.

“HMX is produced by the nitration of hexamine with ammonium nitrate and nitric acid in an acetic acid/acetic anhydride solvent at 44°C. The raw materials are mixed in a two-step process and the product is purified by recrystallization. This is a modification of the Bachmann Process used to produce RDX, another explosive. The yield of HMX is about 55-60%, with RDX as an impurity. RDX produced by the Bachmann Process usually contains about 8-12% HMX as an acceptable byproduct.”[49]

The reaction is likely exothermic and so I suggest using very gentle heat, and reducing it if the reaction manages these temperatures themselves.
Notice: Making RDX involves using ice baths which helps with temperature control. But when making HMX you want 44°C, this means you can’t use an ice bath and will have less of an ability to control the temperature.
All and all the risk of runaway when making HMX is even greater than when making RDX.
You should have a dump bucket, like when you produce RDX, always present.

[49] “Explosives - Nitramines”, GlobalSecurity, https://www.globalsecurity.org/military/systems/munitions/explosives-nitramines.htm

Formula:
2 (CH2)6N4 + 8 HNO3 (98% conc) + 4 NH4NO3 + 6 (CH3CO)2O → 3 HMX + 12 CH3COOH + 6 H2O

“The first path (→ RDX) is favored by high acidity and/or a high acidity of the nitrating agent, whereas the second path (→ HMX) is favored by lower acidity and/or lower acidity of the nitrating agent. Furthermore, the concentration of ammonium nitrate has an influence on the yield of HMX, whereby the optimum ratio is 2–3 moles of ammonium nitrate to 1 mole hexamine. In addition, the temperature of the reaction is important, since performing the nitration reaction at 44 °C favors the formation of HMX, whereas at 65 °C RDX is predominantly formed.

Tab. 1.2b: Typical ratios of reactants used for the synthesis of RDX and HMX.

reactants	lbs. for RDX production	lbs. for HMX production
ammonium nitrate	17.2	{11.0}
98% nitric acid	13.6	
hexamine	9.2	17.0
acetic acid	15.0	18.0
acetic anhydride	45.0	54.0

,,[50]

In kilograms the ratios become:
4.9895 : 6.1689 : 7.7111 : 8.1647 : 24.4940
Using this exact amount of kg of each will yield theoretically: 24.4 kg HMX.

For 100g of HMX: (theoretically)
20.41g Ammonium Nitrate
25.25g Nitric acid (98% conc)
31.56g Hexamine
33.41g Acetic acid
100.25g Acetic anhydride

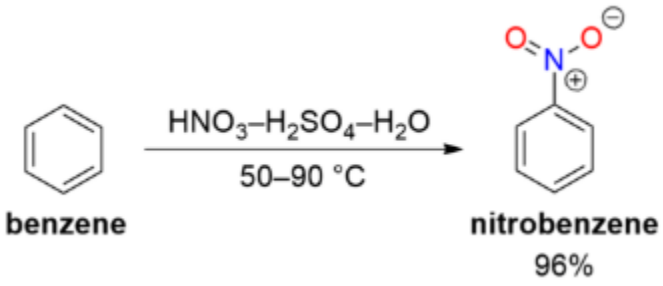
Procedure:
1 Prepare acetic acid and acetic anhydride in a flask,
2 Add nitric acid to the mixture and mind the temperature.
3 Add the ammonium nitrate to the mixture, stir until it dissolves.
4 Gently heat to 44 degrees celsius. From this point be extra slow in addition and mind the temperature. If it rises on its own noticeably, turn off the heat and lift it off the hot plate.
If red gases or any other signs of runaway happens, immediately dump the mixture into the dump bucket and recover whatever RDX and HMX you produced.
5 Add hexamine in small portions slowly, and let it stir under the temperature of 44 degrees celsius.

[50] “Preparative Chemistry review pieces & Bachmann (historical references”, Thomas M. Klapötke, 2025, https://api.pageplace.de/preview/DT0400.9783111447087_A62621008/preview-9783111447087_A62621008.pdf

6 Once everything is added, hold the temperature and let the mixture react for 0.5-1 hour.
7 If the mixture isn't precipitating HMX anymore or it has stood well enough, filter the solution and the HMX will be collected in the filter.
8 Wash the HMX in the filter with cold water a few times to remove any excess acids.

Recrystallization is normally recommended for long term storage. But recrystallizing HMX to begin with is a challenge as there's almost no solvents that dissolve it.
Nitrobenzene is probably the most realistic option as it can dissolve a small amount of HMX, and you could just divide up the HMX and do several recrystallizations.

If you want to make nitrobenzene yourself:



Hexamethylene triperoxide diamine (HMTD)

Molar mass: 208.17 g/mol
Pyro valence: +24
Density: 0.4 g/cm3 Detonation velocity: 2800 m/s
Density: 0.88 g/cm3 Detonation velocity: 4520 m/s RE Factor: 0.74
Density: 1.1 g/cm3 Detonation velocity: 5100 m/s
Decomposes at 75°C, ignites spontaneously at 133°C.
Sensitivity: shock and friction sensitivity is high. Can even react to static electricity and detonate upon burning by flame.

Note: this is a peroxide and these are well known for being very sensitive, unstable and having good detonation power.
Meaning these are most often used as primaries if they are used at all. These are too unsafe to attempt to use as a base charge. It is well known that many terrorists attempting to improvise explosives attempt

peroxides without proper understanding, care or routine to handle it safely. Often maiming or dying attempting to make large suicide bombs.

All this to say: These are unsafe and you should never produce more than 5 grams at once, in case a mistake happens.
And these are only suitable for detonators that are meant to be sensitive.

It is very density and enclosement dependent, and needs an oxidizer. It is recommended to at least press the explosive, with protective barriers in case it explodes.
And ideally you balance HMTD with an oxidizer and then press it with a safety barrier, and/or with stand off distance. And confine it in metal detonators providing pressure build up.
I suggest chlorates or perchlorates as these are strong oxidizers, powders which can be finely mixed with HMTD, and these can be easily made by electrolysis, and lastly because these are stable and more insensitive and would ideally make a mixture that is more easily pressed and handled.

(Side note: Chlorates or perchlorates are the go to oxidizers if the demand for reducing power is great. Meaning you mostly need strong oxidizers rather than strong explosives to balance with.
The only real downside with chlorates and perchlorates is that they are weak explosives and need high density and pressure build up to do much.
That is why ammonium perchlorate is mostly used as rocket fuel rather than explosive.
So if you have more powerful oxidizer explosives to use than do so. But a basic and always easy choice is chlorates or perchlorates, along with density pressing, and metal containers for pressure build up.
Lastly don't try and melt cast HMTD with ETN, ETN does melt at 61°C and HMTD decomposes at 75°C, but it isn't guaranteed the decomposing doesn't start earlier or that heat will always be evenly applied, it could very well form pockets were more heat is absorbed.)

"HMTD may be prepared by the reaction of an aqueous solution of hydrogen peroxide and hexamine in the presence of an acid catalyst, such as citric acid, acetic acid or dilute sulfuric acid. The hydrogen peroxide needs to be at least 12% w/w concentration, as lower concentrations lead to poor yields. Citric acid is overall superior to other acids, providing a yield of up to about 50%."[51]

"Synthesis of Hexamethylene Triperoxide Diamine (HMTD). Caution: HMTD is a powerful explosive. A 125 mL three-neck flask equipped with a paddle-type microstirrer was charged with 7.00 g (50 mmol) of hexamethylenetetramine and 23 mL of 50% H2O2 and chilled to 0 °C (ice/NaCl). While being stirred, 11.5 g (54.7 mmol) citric acid monohydrate was added in 10 small portions over the course of 2 h. The clear solution was stirred at 0 °C for an additional 8 h; the ice-bath was removed, and the solution was allowed to warm slowly to room temperature. The resultant opaque mixture was stirred for an additional 2 h, the micro-stirrer was removed, and the flask containing the product was re-chilled in ice for 30 min. The white crystalline material was gravity filtered and then rinsed with 350mL icewater, followed by 220

[51] "Hexamethylene triperoxide diamine", wikipedia, 10 Jun 2025, https://en.wikipedia.org/wiki/Hexamethylene_triperoxide_diamine

mL ice-cold CH3OH rinses. The crystalline material and filter paper was dried in a vacuum desiccator (CaSO4) overnight to afford 5.75 g (27.6 mmol; 55%).” [52]

For 1g HMTD:
1.2g Hexamine
16.6mL H2O2 (12% conc)
2g Citric acid monohydrate.

For 5g HMTD:
6.09g Hexamine
83.26mL H2O2 (12% conc)
10g Citric acid monohydrate.

These are calculated if you use 12% conc instead of 50% hydrogen peroxide, and achieve the same yield in quantity. Now of course it is possible that it is better to use 50% conc hydrogen peroxide, as that would give better yield.

Procedure:
1 Prepare ice bathed H2O2 with automatic stirring.
2 Add hexamine.
3 Add the citric acid slowly in many small portions.
4 Once everything is added, let it react for 2 hours cooled.
5 Remove the ice bath and continue stirring while it reacts for 2 hours.
6 Filter the solution and collect the HMTD in the filter.
7 Wash the HMTD in the filter with cold water a few times.

R-Salt

Molar mass: 174.120 g/mol
Pyro valence: +12
Density: 0.85g/cm^3 Detonation velocity: 5100m/s
Density: 1g/cm^3 Detonation velocity: 6200m/s

[52] “Density Functional Theory and X-ray Investigations of P- and M-Hexamethylene Triperoxide Diamine and Its Dialdehyde Derivative”, Wierzbicki and co, 21 jun 2001, https://www.pismin.com/10.1021/jp0123841

Density: 1.4g/cm^3 Detonation velocity: 7300m/s
Density 1.57g/cm^3 Detonation velocity: 7800m/s
Melting point: 105℃
Decomposition point: 150℃
Sensitivity: Insensitive to shock, friction and heat. Hitting with a hammer can cause detonation. And flames cause decomposition and gas output.

Dugan says:[53]

Storage life of R-Salt is very good. Dugan notes a study where it was stored for 6 years, protected from the sun and moisture, and showed no signs of decomposition.
Cooler temperatures have better yield. Never exceed 40℃, this will cause a great loss in yield.
Keep the temperature as low as possible.
Sulfuric acid does have the best yield, but reacts violently when in contact with R-Salt. So there's some noticeably gaseous output when sulfuric acid and R-Salt come in contact, showing decomposition and loss of R-Salt.
So it is highly recommended to use hydrochloric acid instead. Almost has the same yield, is much cheaper and accessible, and doesn't react violently with the end product.

Solvents for R-Salt are acetone and isopropyl alcohol, meaning these can be used to recrystallize the explosive to remove trapped acids.

R-Salt is fitting for base charges in detonators. But it is also good all around explosive.

Formula:
$C_6H_{12}N_4$ (hexamine) + 4.77 HCl + 4.77 $NaNO_2$ → $C_3H_6N_6O_3$ + NaCl + H_2O
(Estimate based on following procedure:

[53] "R-SALT", Dugan Ashley, 9 Dec 2024, https://odysee.com/@DuganAshley:e/tmtn2:5

Procedure

Synthesis of R-salt (1,3,5-trinitroso-1,3,5-triazacyclohexane)[1]: To a stirred solution of 21g (0.15 mol) of hexamine in 280 mL of water and 120g of ice was added an ice-cold solution of 68 mL of cold conc. HCl and 200g of ice. The acid solution was stirred while a solution of 50g (0.72 mol) of $NaNO_2$ in 50 mL of water and 30g of ice were added. The reaction mixture turned blue and then green and foamed up with the precipitate rising to the surface. The mixture was allowed to stand 0.5h without stirring. The precipitate was collected by suction filtration, washed with water, and air-dried to give 10.5g (40%) of a light

Dugan notes he got better yields by stirring heavily in the portion where it says: “0.5h without stirring”. So it is recommended to stir.)

For 100g R-Salt:
80g Hexamine
260mL Hydrochloric acid
191g Sodium nitrite
(extra 1257.3mL cold water, 1409.7g ice, would be a corresponding amount added to the vessel to cool the reaction, compared to the procedure Dugan Ashley follows)
(Gives a ball park estimate of how much cold water and ice might need to be used to cool the reaction, and this can be added directly into the reaction vessel.
An ice bath isn’t technically necessary, you can just add ice cold water or ice directly into the vessel. But you can also use an ice bath with or without salt in conjunction with adding ice and cold water directly into the vessel.)

Procedure:
1 Prepare a solution of heavily stirred hexamine and cold water. Keep it automatically stirring heavily and temperature below 10C, ideally as cold as possible meaning close to 0C.
2 Add ice cold concentrated HCl (30-40%)

3 Add sodium nitrite. To control the temperature, add ice cold water or ice directly into the vessel at any point of this procedure.
4 Once everything is added, keep it stirring heavily and cold for at least 30 min. Going longer is fine, like an extra 30 min.
5 Pour off into a filter. And wash the R-salt in the filter a few times with cold water.
6 Dissolve the R-salt in acetone.
7 Pour off into cold water, let it precipitate.
8 Filter and wash the R-salt again.

At this point you have essentially pure R-salt.

Nitro-compounds

Nitrocellulose

Also called guncotton.

Molar mass: Depends on variant:
Mono: 207.138 g/mol
Di: 252.135 g/mol
Tri: 297.132 g/mol
Pyro valence: +43
Density: 1.40 g/cm^3 Detonation velocity: 6400m/s RE factor: 1.10
Sensitivity: Medium, burns when heated with flame

There are three variants of nitrocellulose. The strongest and desired is the cellulose trinitrate.

The greater concentration of nitric and sulfuric acid increases the nitration.
Meaning low water content is desired to achieve the trinitrate.
You can nitrate with lower concentrate of acids but test the strength of the nitrocellulose to see if you achieve strong enough nitrate and if it detonates properly.

Secondly nitrocellulose is very density and confinement dependent. To achieve the explosive power of nitrocellulose you need to press it in a small enclosed space, to maximize the density and so it all detonates at once.
Nitrocellulose is a lot safer to press than other explosives, but it should be noted, which should feel obvious, and that is not to slam the nitrocellulose into the container with the pressing tool.
The high pressure of both nitrocellulose and oxygen could detonate it.
So press normally the nitrocellulose tightly until it is at max density.

Formula:
$3\ HNO_3 + C_6H_7(OH)_3O_2\ (+\ H_2SO_4) \rightarrow C_6H_7(ONO_2)_3O_2 + 3\ H_2O$

For 100g nitrocellulose:
55g cotton
63.6g or 42.1mL Nitric acid (100% conc)
33g or 17.9mL Sulfuric acid (100% conc)

If you use lesser concentrations, divide the volume of the pure acid with the concentration. And weigh the dry product at the end to test how close you achieve the weight. The closer you are to the theoretical weight the closer you achieve the proper nitration.
Basically the ideal is to double the weight of the cotton you are nitrating.

Procedure:
1 Prepare a nitric acid and sulfuric acid mixture, in a beaker placed in an ice bath. Use a thermometer to make sure the temperature stays under 18 degrees celsius.
2 Add regular cotton and let it sit and soak in the acid solution, let the cotton soak for 24 hours.
3 Transfer the cotton to a coffee filter to wash it.
4 Let it dry somewhere else.
5 Wash the cotton again in a new coffee filter.
6 When the cotton tests neutral with litmus paper, it is ready to be dried and stored.

Alternatively:
Prepare the nitric and sulfuric acid solution in a beaker and put it in the fridge to cool it down, so that it is kept under 18 degrees celsius. Add the cotton and watch the temperature with a thermometer. Once all is added, place a plastic bag over with a rubber band. Wait 24 hours. Use a coffee filter to filter the nitrated cotton and wash it with water.

Nitroglycerine

Liquid explosive

Molar mass: 227.085 g/mol
Pyro valence: -1
Density: 1.59g/cm^3 Detonation velocity: 7700m/s RE factor: 1.54
Melting point: 12.8℃
Boiling point: 218℃ (Explodes)
Sensitivity: High, detonates in contact with flame, and is detonated upon hitting it with a hammer.

Formula:
$C_3H_8O_3 + 3\ HNO_3\ (+\ H_2SO_4) \rightarrow C_3H_5N_3O_9 + 3\ H_2O$

For 100g nitroglycerine:
40.5g or 32.2mL Glycerol
83.2g or 55.1mL Nitric acid (100% conc)
43.2g or 23.5mL Sulfuric acid (100% conc)

Procedure:

1 Add the sulfuric acid and the nitric acid in a beaker, then stir thoroughly.
2 Put the beaker in an ice bath with a thermometer, and let the mixture cool below 10 degrees celsius.
3 Use a pipette to slowly drop the glycerol, while stirring, into the mix, while using the thermometer to keep the mixture about 10 degrees celsius. The temperature is important as to avoid a potential runaway reaction, which will happen if the temperature rises too much, which can be caused from the heat caused from the added glycerol. Were the mixture to rise in temperature above 22 degrees celsius stop adding glycerol and stop stirring. The mixture should never be allowed to rise above 30 degrees celsius, this might lead to the runaway reaction. A reaction where the mixture will heat itself up until it reaches 50 degrees celsius, where it explodes. Were the reaction to rise above 30 degrees celsius, dump it out into the ice bath.
4 After all the glycerine is added and has been heavily stirred, wait for 30-60 minutes and pour the mixture into a second beaker with ice cold water, the nitroglycerine will naturally settle at the bottom.
5 Use another pipette, preferably larger, to remove as much as possible of the non-nitroglycerine liquid.
6 Add a sodium bicarbonate solution (mixture with water) to the remains in the second beaker. To neutralize the remaining acid. Use litmus paper to determine if there's a presence of acids left, if there is, repeat this step.
7 Use the third and final pipette to collect the nitroglycerine at the bottom and move it to your glass container.
8 Store your nitroglycerine in a dry and cool place, preferably void of natural sunlight.

Nitrostarch

Molar mass: 297.13 g/mol
Pyro valence: +9 (based on formula)
Strength and sensitivity: similar to that of nitrocellulose. Its properties are heavily dependent on the level of nitration and density and confinement.

$C_6H_{10}O_5 + 3\ HNO_3\ (+\ H_2SO_4) \rightarrow C_6H_7N_3O_{11} + 3\ H_2O$

For 100g nitrostarch:
55g Starch
64g or 45.1mL HNO_3 (100% conc)
33g or 18mL H_2SO_4 (100% conc)

Procedure:[54]
1 Ice bath cooled nitric acid (100% conc).
2 Slow portioned addition of starch.
3 Reaction time 30 min under cooling and stirring.
4 Pour out in water. Nitrostarch is insoluble in water and will precipitate.
5 Filter and wash in the filter with cold water.
For recrystallization dissolve in alcohol (ethanol, acetone, etc) and then crash out in water again.

Trinitrotoluene (TNT)

Molar mass: 227.132 g/mol
Pyro valence: +21
Density: 1.60 g/cm^3 Detonation velocity: 6900 m/s RE factor: 1.00
Melting point: 80.35℃
Boiling point: 240℃ (decomposes)
Sensitivity: Insensitive to shock, friction and heat. When heated with flame it will only melt slowly before eventually decomposing.

[54] "Nitrostarch Synthesis and Tests", Edward Tries, 28 May 2023, https://www.youtube.com/watch?v=oWUbduRo8Ns

Commonly used for its safety and power, and in melt cast compositions. Making combined and balanced explosives.

Trinitrotoluene, better known for its abbreviation TNT, also known as; 2-Methyl-1,3,5-trinitrobenzene,
2,4,6-Trinitromethylbenzene,
2,4,6-Trinitrotoluol,
Tolite, Trilite, Trinitrotoluol, Trinol, Tritolo, Tritolol, Triton, Tritone, Trotol, Trotyl.

Toluene is a precursor and the critical reagent for trinitrotoluene. It can be produced from many sources and thus almost impossible to regulate.
It can be derived from wood alcohol and coal. It can be distilled off gasoline.
Toluene is sometimes called toluol in stores.

Trinitrotoluene is a melt-cast explosive that can be used to increase the density in other explosives.

The destination velocity of TNT is 6900 m/s.
P 16 GPa.
The density of TNT is 1.654 g/cc.

The melting point of (very pure) TNT is 80.8 degrees celsius.

TNT is very insensitive, more so than picric acid.

Many compositions of TNT explosives use wax to desensitize it, meaning to make it more insensitive and stable.

The general idea of synthesis of TNT is that you're progressively nitrating toluene. First mononitrotoluene (MNT), then dinitrotoulene (DNT) and then finally trinitrotoluene (TNT).
Industrially they separate some of the MNT and DNT along the process to use them for different purposes and nitrate the TNT in many stages.
The reaction does require a lot of liquid like alcohol to keep recrystallizing the TNT until it's fully purified. It also requires a lot of sulfuric acid, to combat the dilution from water being produced and so the sulfuric acid also works as a drying agent.
All and all it is still a very safe and realistic reaction, but it might need special equipment and some experience or familiarity with chemistry.

Some hazards of producing TNT are:
Nitric Oxide/Nitrogen Oxide, white and clear gas that is poisonous and damaging to your lungs.
Nitrogen Dioxide, yellow-orangish gas that is also harmful.
Carbon Monoxide, is a colorless, odorless, tasteless, flammable and poisonous gas.
Concentrated acids in high temperatures.
This reaction should therefore be done in a well ventilated area with a fume hood and proper equipment.

One should wear, pvc apron, gloves, long sleeves, and eye protection, possibly even a gas mask.

The reaction is still safer than to produce erythritol tetranitrate (ETN) and RDX.

If committing oneself to producing TNT, one should do batches upwards of hundreds of grams at least.

Industrial yields are in the ratios of:
1 g Toluene : TNT 1.9 g

The homemade processes will not achieve this ideal ratio, the yield will be lower since one is not using industrial grade purity of acids.

But in theory one should be able to produce about 152 g of TNT off of 80 g toluene.

An RGD-5 hand grenade, a standard russian hand grenade, uses about 110 g of TNT.

Landmines for vehicles and tanks use ca 10kg TNT.

TNT is great for storage and can withstand 20-30 years and still work perfectly.

Large quantities of TNT will explode if burned, but smaller quantities can be burned and will just cause a strong flame.

One-stage/Dugan's recipe:[55]

There are two methods of synthesis: one stage nitration or two stage nitration.
Both are covered and described in G. Carlton Smith's book "TNT Trinitrotoluenes and Mono- and Dinitrotoluenes: Their Manufacture and Properties."[56]
Dugan Ashley has made his variant of the one stage method, which you can follow in his video at reference 54.

This route is tailored towards homemade preparation. The used chemicals are toluene, ammonium nitrate and sulfuric acid, which are easily acquired.
Some drain cleaners with high sulfuric acid concentration (upwards of 85%), can be used directly without any steps of extraction or purification.

Acid Mix: sulfuric acid 75%, nitric acid 25%

[55] "TNT [Trinitrotoluene]", Dugan Ashley, 17 Nov 2023, https://www.youtube.com/watch?v=H0OI3hyjkFM
[56] "TNT Trinitrotoluenes and Mono- and Dinitrotoluenes: Their Manufacture and Properties.", G. Carlton Smith, 1918,
https://dn790003.ca.archive.org/0/items/tnttrinitrotolue00smitrich/tnttrinitrotolue00smitrich.pdf

Ratio of Toluene : Acid Mix
is 1 : 12

The ratio of reactants by weight:
Toluene 1 g
H_2SO_4 9 g
HNO_3 3 g

Equipment/Set Up:

1 Three neck, parallel, round bottom flask - this will be the reaction vessel.
One neck is used for the thermometer.
Second neck is used for the automatic stirrer, preferably the middle neck is suited for this.
Third neck has a condenser which will let some gasses escape but also let some condense back into the mix. Again make sure this is done in a well ventilated area and with a fume hood.

2 Allihn condenser - this will be the condenser attached to one of the necks.
Liebig and dimroth condensers work as well.
What you don't want to use is the graham condenser, this will get clogged up with nitric acid.
The condenser is important to help reduce the amount of gas being released and instead reintroduce it, it will also help avoid gas build up which causes low yields.
The taller the condenser the better.

3 Dropping funnel - this will be connected to the neck that the condenser will later have. The dropping funnel is going to be used to drop the toluene into the acid mixture, once that's complete, then the dropping funnel can be replaced with the condenser.
Ideally you want to use a pressure equalized dropping funnel. This is a dropping funnel where the pressure at the bottom and the top are equal.

4 Automatic stirrer capable of stirring around 1000 rotations per minute

5 PTFE holder, the stirrer may need something to hold it in place and to cover so that no gas leaks out. PTFE is a good plastic that can be used, especially for the heat and acids that will be used. So one could buy a PTFE plastic cap, drill a hole in it, for the stirrer, then attach it with PTFE tape, or glue if the plan is to only use this round bottom flask for TNT synthesis.

6 Standard thermometer holder, there already exist standard airtight holders for thermometers that one can buy for a round bottom flask. If the thermometer holder doesn't seem airtight enough, one could always use PTFE tape to help seal it.

7 Heating mantle or hot plate, to heat the mixture

8 Ice bath, one can apply salt to the ice and water mixture to help keep it cool.

To react 80 g of toluene you need a 1 liter round bottom flask, it's possible to do 90 g in a 1 liter but it is really pushing it.

So if one wants to upscale the process it's simple. 160 g toluene needs 2 liter round bottom flask, 400 g toluene needs a 5 liter round bottom flask, etc.
To calculate how many liters the round bottom flask needs in volume, just divide the total amount of toluene in grams you plan to use with 80, then round upwards for safety.
Ex: 500 g toluene, 500/80 = 6.25, rounding upwards we get 7, so we need a 7 liter round bottom flask.

The ratio of all chemicals used by weight:
Toluene 1 g
Ammonium nitrate 3.81 g
Sulfuric acid 13.66 g [100%]

If not using 100% pure sulfuric acid (which you most likely are not), use the following equation to calculate the needed sulfuric acid:
a = total acid solution used
c = concentration
s = sulfuric acid needed

a*c = s
a = s/c

Basically just divide the needed amount of sulfuric acid by the concentration you're using, to calculate how much of the sulfuric acid solution you need.
Ex: I need 100 g of sulfuric acid and have a 85% sulfuric acid solution.
100/0.85 = 117.647… ~ 118, So you need approximately 118 grams of this 85% sulfuric acid solution.
One Liter Batch:
Toluene 80 g
Ammonium Nitrate 304.8 g
Drain Cleaner [90%] 1213 g

Procedure:

1 Prepare the acid mixture by adding the ammonium nitrate and sulfuric acid to the beaker, mix them heavily until the ammonium nitrate is fully dissolved.

2 Once fully dissolved, pour acid mixture into the round bottom flask.

3 Place the round bottom flask in an ice bath and let the mixture cool down.

4 Prepare the necks, add the automatic stirrer, the thermometer and the dropping funnel with the toluene loaded. Make sure everything seems airtight. Again make sure that the room is well ventilated and use a fume hood.

5 Start dripping in the toluene very slowly and one drop at a time. This process should take as long as it has to. Also make sure that the automatic stirrer is running close to 1000 rotations per minute, it's okay if it is less, especially in later stages, but it's important to stir very heavily early on.
The reaction is exothermic and will produce heat, this will increase the temperature. The goal is to keep the temperature under 30 degrees celsius at all times. The ice bath helps with this, but it is needed that the dripping process is slow enough so the reaction gets the chance to cool down.
If you get too close or even over 30 degrees celsius, stop adding and wait until the reaction cools down. Temperature control is important for the yield, as it avoids oxidation, and the possibility of a runaway reaction.
Again this process can take up to 1-2 hours, and it should if it needs to.
Once everything is added, the mixture will have turned a slight red in color, this is the MNT that is produced.

6 Once everything is added, let it keep stirring for a while.

7 Remove the dropping funnel and replace it with the condenser.

8 Replace the ice bath with the heating mantle or hot plate.

9 Increase the temperature to 90-95 degrees celsius, hold this temperature for 2 hours, once it is achieved. Keep the stirrer on. This will produce the DNT. The color will start to turn orange around 70 degrees celsius.

10 Once the 2 hours has surpassed, increase the temperature to 120-125 degrees celsius, and hold that temperature for 2 hours, once it is reached. This will produce the TNT. This will be noticed by the color turning more yellow.

11 Once these 2 hours have passed, turn off the heat and let the mixture cool down, while still stirring.

12 Once the reaction is down to 30-60 degrees celsius and no more gasses are present in the system. Then start to pick apart the apparatus. Remove the condense, thermometer and the automatic stirrer.

13 Pour the mixture into an equal volume of water. This will precipitate the crude TNT cake.

14 Stirr this by hand during the precipitation.

15 As the TNT precipitates it will float to the top, this makes it possible to scoop out the TNT with a plastic spoon, into a new beaker. Keep going until all TNT is collected.
Notice that there is going to be a lot of waste fluid, the best way to get rid of the waste fluid, once the entire process is done, is to burn it.

16 Take this beaker with crude TNT cake and place it on a hot plate.

17 Add sulfuric acid, so that 70% percent of the weight is sulfuric acid.

18 Heat the mixture beyond 80 degrees celsius and use a stirring bar. This will make the TNT molten, keep stirring the TNT like this for ca 15 min. This is a surface washing of the TNT which will make the TNT into small molten droplets.

19 After 15 min, turn off the heat and add water again to dilute it, making the TNT precipitate.

20 Remove the TNT from this mixture, and put it in pure water.

21 Heat the water beyond 80 degrees celsius and use a stirring bar again. This is called a hot wash, this is done to remove acids present inside of the TNT. Hot washes can be performed as many times as you like, preferably a few times (industrially they do around 7-8). Just let the TNT cool down and precipitate between each hot wash.

22 Once the hot wash (or washes) are complete remove the TNT from the water and place it into its own beaker.

23 Now add isopropyl alcohol (>70% concentration), heat the mixture and use a stirring bar. This should lead to the TNT dissolving, if it does not, then add more isopropyl alcohol. Add just enough to dissolve the TNT. This is done to recrystallize the TNT. Once it’s dissolved the mixture should turn red.

24 When it has fully dissolved in hot isopropyl alcohol and stirred for a bit, add a lot of water to make the TNT precipitate. Repeat this recrystallization of TNT with isopropyl alcohol (steps 23-24) until the mixture doesn’t turn red.
As with the hot wash, the mixture is allowed to cool and the TNT to precipitate, with each iteration.

25 Once you don't get red liquor, make the TNT precipitate with the addition of water for the last time.

26 Then collect the TNT.

The ultimate standard by which you should judge the TNT is by melting it, to see what the melting point is. If it is in the range of 75-80 degrees celsius, then essentially pure TNT has been produced.

Two-stage/Old Italian:

There are two methods of synthesis: one stage nitration or two stage nitration.

Both are covered and described in G. Carlton Smith's book "TNT Trinitrotoluenes and Mono- and Dinitrotoluenes: Their Manufacture and Properties."[55]
For even more specific details on how to perform a two-stage operation, you can read in his book in the chapter "The Manufacture of TNT".
Otherwise I recommend performing Dugan's one stage nitration route.

a describes first nitric/sulfuric acid preparation.
b describes the nitration to DNT.
c describes the new acid preparation and nitration to TNT.
d describes purification.

a1 Add ammonium nitrate in a beaker.
a2 Place beaker in an ice bath and use thermometer to keep the temperature below 25 degrees celsius
a3 Slowly add sulfuric acid to keep the temperature from rising above 25 degrees. Stir thoroughly using the thermometer. This becomes orange goop.

b1 Sulfuric and nitric acid mix in a round bottom flask. (Preferably with two openings one for the drip column and one for the thermometer, both of which need to be air tight).
b2 Add a drip column to the round bottom flask with the toluene loaded.
b3 Place the ice bath under and around the round bottom flask. To keep the temperature under 60 degrees.
b4 Add the toluene drip for drip. While using a stirring bar to stir the mixture.
b5 Once everything is added, remove the ice bath and instead heat up the mixture to 80-85 degrees celsius and let the mixture sit and stir for 3.5 hours.
b6 Pour over the liquid to a beaker to let it cool and solidify. DNT cake will solidify in the bottom.
b7 Collect the DNT to wash it in water.

c1 Prepare a new sulfuric and nitric acid mixture in the round bottom flask. This time using nitric acid and oleum (fuming sulfuric acid).
c2 Add the DNT cake in small bits at a time. Stirring with the stirring bar.
c3 Once it is all added, slowly raise the temperature to 125 degrees celsius, then let it reflux for 3.5 hours.
c4 Pour the new liquid into a beaker to cool. The TNT will solidify at the bottom.
c5 Pour out the remaining liquid waste.
c6 Scoop out the TNT cake.

d1 Wash the TNT cake with heated up 10% sodium sulfite. Then stir for 15 min.
d2 Clean the TNT with hot water.
At this point military grade TNT is achieved. Further steps are to achieve pure TNT.
d3 Wash The TNT with dilute H_2SO_4.
d4 Wash the TNT with hot water again.
For even more purity.
d5 Have the TNT dissolve in methanol and recrystallize
Pure TNT Achieved.

Nitroguanidine

Molar mass: 104.07 g/mol
Pyro valence: +4
Density: 1.32 g/cm^3 Detonation velocity: 6750 m/s RE factor: 0.95
Density: 1.77 g/cm^3 Detonation velocity: 8586 m/s RE factor: 1.50
Sensitivity: Generally very insensitive.

Nitroguanidine, abbreviated NQ or NGu, has the chemical formula $CH_4N_4O_2$ or $(NH_2)_2CNNO_2$.

Nitroguanidine is commonly found in insensitive munitions, like armor piercing weapons. The idea is that the shell pierces the armor before the explosion is triggered. Nitroguanidine is very insensitive and thus its capabilities suit these kinds of munitions.

Nitroguanidine may even be more insensitive than TATB.
Although TATB has a higher temperature of decomposition, of 331 degrees celsius.
The decomposition temperature of nitroguanidine is a range between 220-257 degrees celsius. It decomposes without melting.

Nitroguanidine can also react with propylamine to make propyl nitroguanidine (PR NQ). The propyl extension drops the melting temperature to 98 degrees celsius. This explosive can therefore easily be melted, cast or shaped in different types of explosives. Which makes it a possible alternative for trinitrotoluene.
The name for this type of explosive is melt-cast carrier or melt-cast carrier explosive.

The explosive capability of nitroguanidine is heavily dependent on density. Therefore it should be packed very tightly.
Detonation velocity is calculated by this equation:
For low density (<0.6 g/cc):
Vd = 2091+ 2464 * [density] (m/s)
Ex: 0.3 g/cc → ~2.830 m/s, which is similar in strength to that of ammonium nitrate.

For high density (>1.0 g/cc):
Vd = 1440 + 4015 * [density] (m/s)
Ex: 1.78 g/cc → ~8.586 m/s

Nitroguanidine is also the precursor for other explosives:
Aminoguanidine
AminoNitroguanidine Nitrate (ANQN)

The critical diameter of nitroguanidine is > 14 mm. Meaning when making explosive charges with nitroguanidine the diameter needs to be bigger than 14 mm.

Synthesis by Dugan method:[57]

GuN (guanidine nitrate) + HNO3 + H2SO4 → NGu (Nitroguanidine)

For 100g nitroguanidine:
117g Guanidine nitrate
61g or 40mL Nitric acid (100%)
94g or 51mL Sulfuric acid (100% conc)
(Note: I give the stoimetric amount but dugan recommends using a large excess of sulfuric acid, even upwards of 3 times the weight of guanidine nitrate. So one might want to try different amounts of excess sulfuric acid.)
(Furthermore Dugan recommends adding ammonium nitrate, about 1/5, of the weight of Guanidine nitrate. In this case that would be:)
23.4g Ammonium nitrate

Procedure: (Notice: using an overhead stirrer is suitable if making larger quantities.)
1 Prepare a beaker with sulfuric acid, then place it in an ice (and salt) bath and let it cool down to 0 degrees celsius.

2 Place the guanidine nitrate in the freezer to make it cold also.

3 Once everything is cool and ready, start the stirrer and slowly add guanidine nitrate. Then add all the ammonium nitrate in the same fashion.

The goal is to keep the temperature as low as possible to maximize yield, a good working range is under or around 10-20 degrees celsius. This reaction is very forgiving in terms of yield, so using this range is much more than sufficient.

The ideal would be to keep the temperature around 0 degrees celsius always.
The reaction is exothermic meaning it produces heat. Avoid that the temperature should ever rise above 40 degrees celsius.

[57] "Nitroguanidine aka [NQ]" Youtube, Dugan Ashley, 28 Sep 2023
https://www.youtube.com/watch?v=Wc2HzwOMIVE

4 Once everything is added and has dissolved into the solution, let the stirrer and reaction continue for 1 hour.

5 Prepare a new beaker or vessel with crushed up ice and keep it in the fridge until the reaction is complete. Do this about 10 min before the 1 hour is up. Make sure to use quite a lot of water.

6 After the 1 hour has passed, pour the mixture into the new beaker filled with ice cold water. This will precipitate the nitroguanidine.

7 Once the nitroguanidine has precipitated, filter and wash the nitroguanidine using a simple coffee filter and collect the nitroguanidine.
Notice though a recrystallization is needed that's why we continue with step 8.

8 Prepare one more beaker with water, heat it up until it's boiling, then add the nitroguanidine to it. Make sure to use a lot of water and to use an automatic stirrer. If all of the nitroguanidine doesn't dissolve add more water.

9 Once everything is dissolved, put the beaker in the fridge, this will cool down the mixture and nitroguanidine will precipitate again.

10 Filter, wash and collect the purified nitroguanidine.

Nitrourea

Molar mass: 105.05 g/mol
Pyro valence: +1
Density: 1.73 g/mol Detonation velocity: 6860 m/s RE factor: 1.01
Boiling point: 155℃ (decomposes)
Insensitive: Medium shock sensitivity, low friction sensitivity.

Nitrourea is slightly more sensitive and noticeably more powerful than its precursor urea nitrate.
Nitrourea is generated by dehydrating urea nitrate in acidic solutions.
Basically you add urea nitrate to concentrated sulfuric acid with ice bath temperature control.
So remember to use dry urea nitrate and a very high concentrate of sulfuric acid.
Lastly there's a potentiality that adding dry ammonium nitrate will help increase the process, at least theoretically it should. And so it is recommended to try some batches having ammonium nitrate prepared with the sulfuric acid, to see if it does increase yield.

Formula:
$CH_5N_3O_4$ (urea nitrate) + H_2SO_4 → $CH_3N_3O_3$ (nitrourea)

For 100g nitrourea: (theoretical)
103g Urea nitrate
93.4g or 51mL Sulfuric acid (100% conc)

For 100g nitrourea: (based on practical yield from this study[58])
167g Urea nitrate
1073g or 583mL Sulfuric acid (100% conc)
(Note probably doesn't need this much H_2SO_4 though it does keep the reaction more dry).

Procedure:
1 Put pure sulfuric acid on an ice bath. Always keep as close to 0℃ as possible. (Slowly add ammonium nitrate if you intend to utilize this as well).
2 Add in small portions and slowly urea nitrate.
3 Once everything is added, stir the reaction while keeping an eye on the temperature.
4 Reaction time is 30 min until you pour it in ice cold water (like the ice bath).
5 Filter and collect the nitrourea.
It can be recrystallized ethanol, methanol or acetone.

[58] "Nitrouera", A. W. Ingersoll and B. F. Armendt, 1925, https://www.orgsyn.org/demo.aspx?prep=cv1p0417

Nitromethane

Molar mass: 61.04 g/mol
Pyro valence: +3
Melting point: -28.7℃
Boiling point: 101.2℃
Density: 1.13 g/cm^3 Detonation velocity: 6360 m/s RE factor: 1.10
Sensitivity: low sensitivity to shock and friction. Can burn or even explode when heated with flame.

Nitromethane is commercially available as race car fuel, but in modern times the sale of this compound is heavily restricted and monitored.
If you can find, buy or steal it I recommend doing so, but be careful and create distance and no leads between its purchase and usage.
If you happen to have access to the precursors and are able to perform the synthesis then I recommend trying the synthesis I will share on a small scale. Before trying any serious preparation.

The synthesis is long and complicated, so for this I won't give all the formulas or each stoimetric balance for each step.
Rather I will provide the procedure and it mentions its practical yield in the end, from which you can calculate and estimate your own expected yield.

The synthesis is a chain of 4 reactions:

(1) acetic acid + chlorine gas (+ sunlight/UV light)→ chloroacetic acid

(2) chloroacetic acid + sodium hydroxide → sodium chloroacetate

(3) sodium chloroacetate + sodium nitrite → nitroacetic acid

(4) nitroacetic acid → nitromethane

Chlorination of acetic acid, Chloroacetic acid, 1:

Dilute acetic acid can be used.
But to achieve pure chloroacetic acid, glacial acetic acid needs to be used.
So for impure chloroacetic acid:
Bubble chlorine gas into acetic acid

Pure chloroacetic acid:
Reflux glacial acetic acid in the presence of chlorine gas and sunlight. (uv light)

Industrially chloroacetic acid is produced by:
Reacting acetic acid with chlorine gas and using acetic anhydride as catalyst.

Nitromethane synthesis from chloroacetic acid, 2, 3, 4:[59]

1. Procedure

To a mixture of 500 g. (5.3 moles) of chloroacetic acid and 500 g. of cracked ice, is added, with stirring, just sufficient cold 40 per cent sodium hydroxide solution to make the solution faintly alkaline to phenolphthalein. About 360 cc. is required; the temperature should not rise above 20° (Note 1). The solution is then mixed with 365 g. (5.3 moles) of sodium nitrite dissolved in 500 cc. of water and heated in a 3-l. round-bottomed flask fitted with a two-holed stopper containing a bent tube of large diameter connecting with an efficient condenser (set downward for distillation) and a thermometer dipping into the liquid. The receiver should be so arranged that it can be cooled, if necessary, by a stream of water.

The solution is heated slowly until the first appearance of bubbles of carbon dioxide, which occurs when the temperature has reached about 80°. The flame is then removed and the reaction allowed to proceed by itself (Note 2). If no rise in temperature occurs, heat is very cautiously applied until the temperature rises to 85°, when the flame is again removed (Note 3). At this temperature the exothermic decomposition of the sodium nitroacetate becomes so rapid that the temperature rises almost to 100° without further application of external heat. If heat is applied after the temperature of the liquid reaches 85°, violent frothing will occur, with serious loss of nitromethane. If the reaction becomes too vigorous it may be checked by applying a wet towel to the flask. Nitromethane starts to distil over at about 90°. During the spontaneous heating, about 120 cc. of nitromethane distils over, accompanied by about 170 cc. of water (Note 4). This water is saved for redistillation.

When the mixture ceases to maintain its temperature spontaneously at 95–100°, heat is applied cautiously until the temperature reaches 110°. About 13 cc. of nitromethane and 200 cc. of water distil over. Further distillation gives water which contains too little nitromethane to pay for recovery. At this point enough sodium chloride and sodium carbonate have separated to cause serious bumping.

The water separated from the nitromethane distillates is mixed with one-fourth of its weight of salt, and redistilled, yielding 10–12 cc. of nitromethane and about 100 cc. of water. This water on distillation gives 3–4 cc. of nitromethane and about 45 cc. of water (Note 5).

[59] "NITROMETHANE", F. C. Whitmore and Marion G. Whitmore, 1923, https://www.orgsyn.org/demo.aspx?prep=cv1p0401

The total yield of moist product is 125–135 g.; on drying with a little calcium chloride and distilling, 115–125 g. of pure nitromethane, boiling at 98–101°, is obtained (35–38 per cent of the theoretical amount). A small forerun distils over below 98°, and a little dark brown residue remains (Note 6).

2. Notes

1. In making the sodium chloroacetate, the use of sodium hydroxide with proper cooling is much more rapid than the use of sodium carbonate. In the case of sodium hydroxide it is essential to keep the solution cool in order to prevent the formation of sodium glycolate. If it is preferred to employ sodium carbonate, about 300 g. of the anhydrous material will be required to make the solution slightly alkaline.
2. The thermometer dipping in the liquid is absolutely necessary, as the success of the preparation depends on proper temperature control. The vital point of the whole preparation is to remove all external heat as soon as the reaction is well started. This is between 80 and 85°. No frothing ever occurs when this precaution is rigidly adhered to.
3. Several of these distilling sets can be set up and run by one operator, if each lot is started only when the preceding one has reached 85° and external heat has been removed. The corresponding water layers from different sets can be united and distilled at once.
4. It has been recommended 1 that use be made of a gravity separator connected with the adapter in order to separate the nitromethane as fast as it condenses. It was found inadvisable to use such a separator, as the nitromethane is so little heavier than water that a rapid separation is not possible; drops of nitromethane remain suspended and pass over with the water. It is best to allow the distillates to stand in cylinders for at least one-half hour before separating the nitromethane by means of a separatory funnel. During this standing, as much as 2 per cent more of nitromethane sometimes settles out.
5. If the time consumed is an important consideration, it is well to note that the spontaneous heating from 85° to 100° gives three-fourths of all the nitromethane obtained in the preparation. This takes less than one hour. The further heating above 100° and the distillations of the water layers take over two hours, and give only one-fourth of the total yield.
6. It is suggested that improved yields are obtainable when 374 g. of crystalline boric acid is added subsequent to the sodium nitrite and prior to the heating. In this way, carbon dioxide together with some oxides of nitrogen are evolved at about 45°. The reason offered for the higher yields is the destruction of sodium bicarbonate by the boric acid, which thereby prevents alkaline hydrolysis of the sodium chloroacetate (C. L. Tseng, private communication; 2).
The yield is somewhat improved by using 625 g. of chloroacetic acid and about 450 cc. of 40 per cent sodium hydroxide solution instead of the 500 g. and 360 cc., respectively, now specified (H. Adkins, private communication; 2).

3. Discussion

Nitromethane can be prepared by the action of dimethyl sulfate on potassium nitrite,3 or of methyl p-toluenesulfonate4 or methyl chloride 5 on sodium nitrite; and from potassium nitrite and potassium chloroacetate,2 or, preferably, the corresponding sodium salts.6 Nitromethane is now commercially

available as a product of the vapor-phase nitration of the lower paraffin hydrocarbons.7 This preparation is referenced from:
Org. Syn. Coll. Vol. 1, 413

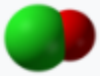
Possible set up: (possible route in which compounds serve many purposes, though it uses nitric acid)

react sodium chloride with acetic acid, this makes sodium acetate and chlorine gas.
save chlorine gas for later.
put sodium acetate in a distillation station, add nitric acid, this makes sodium nitrate and acetic acid vapor.
distill over the acetic acid, which is pure, meaning glacial acetic acid.
reflux the glacial acetic acid in the presence of chlorine gas and sunlight, use the chlorine gas from earlier.
this makes chloroacetic acid.
heat the sodium nitrate to 500C to decompose it into sodium nitrite and oxygen, collect pure oxygen.
add sodium hydroxide to chloroacetic acid. this makes sodium chloroacetate.
add sodium nitrite to the sodium chloroacetate. this makes nitroacetic acid.
heat the nitroacetic acid, carefully, to 80C to decompose it into nitromethane.

equipment and chemicals:
sodium chloride
sodium hydroxide
acetic acid
nitric acid

gas collector
distillation station
reflux station

Chlorates

Chlorine oxidation state	−1	+1	+3	+5	+7
Name	chloride	hypochlorite	chlorite	chlorate	perchlorate
Formula	Cl^-	ClO^-	ClO_2^-	ClO_3^-	ClO_4^-
Structure					

Chlorine has several “oxyanions” variants. These can be listed in series because the difference is just how much they have been oxidized.
The addition of oxygen makes the substance more strongly an oxidizer and more explosively capable.
It is at the range of chlorate and perchlorate whereby these can be used for explosives. And they can be balanced with fuel explosives to achieve oxygen balanced explosives.

In fact at the range of perchlorate, substances like ammonium perchlorate are such strong oxidizers and have powerful enough redox such that they can be used in rocket fuel.

To achieve oxidation of chlorine containing compounds usually involves applying energy. The oxygen is often available in most mediums, in the air or water.
And so there are different methods of introducing energy to these materials to cause oxidation in an oxygen rich environment to oxidize the material.

These are the most common option:
1 Electrolysis in an unpartitioned cell of water.
2 Thermally decomposing the dry compounds.
3 Heating or boiling the compound in a water solution.

What these methods do is that they apply just enough energy to trigger the oxidizing reaction, but not too much energy which causes decomposition and the loss of oxygen.

Chlorides are common salts which are found and purchased everywhere. And seawater naturally has a lot of sodium chloride.

Hypochlorites and chlorites are strong oxidizers often used for bleach and industrial bleaching processes.
You can also find hypochlorites in pool sanitation products.
Meaning these are often found in bleach, pool tablets or other sanitizing or cleaning products.
But it should be noted when using these that there’s a serious risk in generating poisonous chlorine gas.

Basically when working with bleach:
Do it in a well ventilated place with a fume hood, or ideally outside.
Don’t add vinegar, alcohols (ethanol, methanol, acetone, isopropyl alcohol, etc) or ammonia to bleach, this causes an exothermic reaction and generates chlorine gas.

And be careful if you are going to attempt boiling bleach because this could as well generate poisonous vapors.

So one could start with regular salts or bleaches and from there oxidize these to chlorates or perchlorates. Of course there's naturally an advantage to starting with the higher oxidized materials because it requires less time and energy to oxidize these to the desired level, as they are already oxidized to some degree.

Chlorates and perchlorate ions can switch places that is why some methods on the internet involve "displacement" reactions.
For example they might have calcium hypochlorite available, and decide to generate calcium chlorate, and then mix this in a water solution with sodium chloride or potassium chloride, to generate sodium chlorate or potassium chlorate.
A similar procedure can be done with perchlorate.

Make sure to check how many ions there are per atom.
For example with ammonium nitrate and sodium perchlorate:
$NH_4NO_3 + NaClO_4$, There is 1 NO_3 per NH_4 and 1 ClO_4 per Na.
Meaning you want to mix equal molar ratios. 1 Ammonium nitrate per sodium perchlorate.

But if you use potassium perchlorate instead:
$NH_4NO_3 + Ca(ClO_4)_2$, there's 1 NO_3 per NH_4 and 2 ClO_4 per Ca, So to balance this you need an extra ammonium nitrate.
$2\ NH_4NO_3 + Ca(ClO_4)_2 \rightarrow 2\ NH_4ClO_4 + Ca(NO_3)_2$

Electrodes for electrolysis: (suited for chlorates)

Titanium

Pros:
works really well
cons:
expensive

Mixed Metal Oxide (MMO)

Pros:
Best for chlorate
Cons:
Expensive

Platinum

Pros
Minimal erosion

Cons
Expensive
Needs minimum salt concentration to avoid erosion

Platinized

Pros:
Same as platinum but less expensive
Cons:
Same as platinum but usually doesn't last as long

Graphite or Carbon (recommended, cheap and works fine, degrades a little over time but it's fine because carbon usually help oxidizers with the oxygen balance)

Graphite or carbon electrodes generally will degrade a little and may cause traces of carbon particles in the solution.
This is fine for the intents and purposes of making explosives. As carbon serves as a fuel. And most chlorates are oxidizers.
The only problem with degradation is that you might have to buy new ones, which is fine because they are very cheap.

Pros
Very cheap
Easy to acquire
Cons
Sensitive to certain pH
Bad at making electrical connections

Lead Dioxide (Second best, cheap and works really well, might require time to safely make it, considering it has poisonous lead, can also be used to make perchlorates)

Pros
Cheap
Very resistant
Works really well and can even produce perchlorates
Cons
Requires some labor to make
Lead is toxic

Can very easily be made at home.[60]
Melt lead into the form of a large flat surface (using any metal but copper).
Then performing electrolysis in dilute sulfuric acid, with lead anode (positive), and copper cathode (negative), at 0.1A, for a few hours.

The brown color disfiguration on the lead electrode indicated lead dioxide.

Regular metal

Meaning everyday items made out of metal. These can be used but might degrade very easily and so it is a very sacrificial usage.
One could just use metal spoons for electrodes if so desired, but needs to be open to the possibility that the spoons will rust and be destroyed in the process.
Pros
Cheap
Cons
Depends, possibly expensive in the long run

Electrodes for perchlorate production:

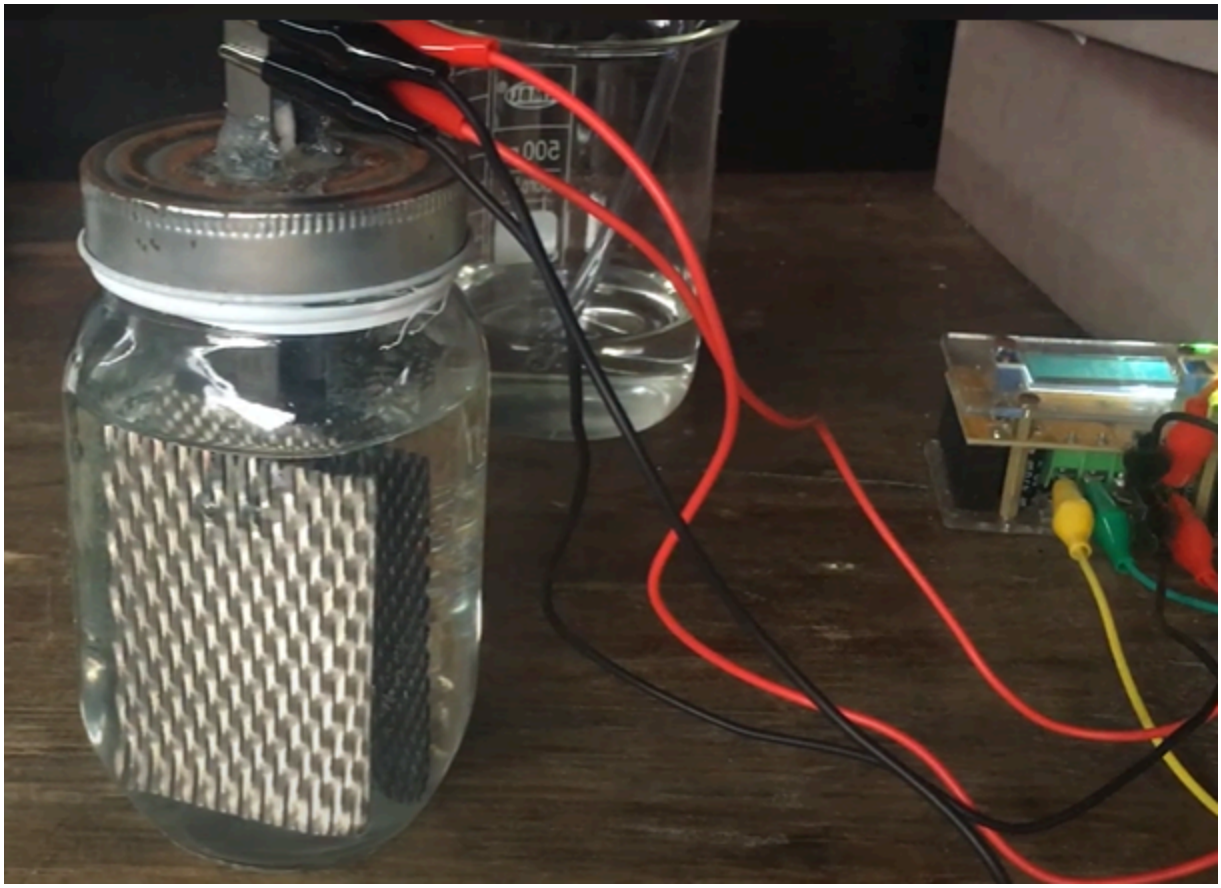
PbO2 electrode

Lead dioxide electrode, these are the ones needed to generate perchlorate by electrolysis.
Making your own lead dioxide electrode:[60]
Simply melt lead and pour it into a long bent shape, forming a long flat surface.
Any metal works except copper, so don't melt or pour lead into copper..
Then perform electrolysis with lead anode (positive) and copper cathode (negative), in dilute sulfuric acid solution, around 0.1A.
Perform this for a few hours, until the lead electrode turns brown indicating lead dioxide.

Melting and Boiling methods:
For the production of chlorates and perchlorates there are favorable conditions to increase the effectiveness and yield:
Higher temperatures, boil the solution or push the product close to decomposition temperature wise.
High concentrations, basically low water content, only add water based on need as to avoid decomposing the reactants.
Keep the pH between 5-9, ideally 6-7.
Catalyst metals are: copper, iron, nickel, etc.

In theory one could just boil bleach or melt pool tablets (containing hypochlorites or chlorites), but one can ideally control the other factors as well. And don't push the temperature to decomposition.

[60] "DIY Lead-Dioxide Electrode: Virtually free and Easy Method", Blue Moonshine, 29 May 2024, https://www.youtube.com/watch?v=tzyUda3upHI



To calculate the correct voltage to use:
You want 0.3 or more ampere per cm^2 area of working electrode.

Meaning you measure one side of the positive electrode, the anode. You measure width and height and calculate the surface area.
Then multiply that with 0.3 A. Which gives you the ampere you need.
You then change the voltage until you reach that amper.

Once the correct current is flowing you want to keep it for long enough. 1280-1800 AH (ampere hours) is more than sufficient to achieve perchlorates, if you are using PbO2 electrode. Otherwise it gives chlorates.
So take 1800 and divide it by the amount to ampere, this will give the most amount of hours you will need to run.

Example:
Width 10cm, height 10cm.
Area $100cm^2$
0.3*100 = 30, 30A, change voltage until you achieve 30A
1800/30 = 60, and hold this for 60 hours.

As you can notice, larger surface area on the electrode increases the amount of ampere delivered, and thus reduces the reaction time.
So highly recommended to use a large flat electrode surface.
And keep this in mind if you are going to make your own PbO_2 electrodes.

The boiling method:

This method is very straightforward to generate chlorates.
Basically boil bleach (the higher concentration hypochlorite the better) for several hours, adding water or more bleach when needed.
After 5 or so hours boil off most of the water to allow everything to precipitate.

The possibility of ozonolysis:

Ozone generators are easily found and bought online. These are often used to clean pools.
They generate the highly reactive gas ozone, which can react with hypochlorites to form chlorates or perchlorates.

Meaning in theory one could bubble ozone gas into sodium hypochlorite bleaches to oxidize these into chlorates or perchlorates.
This could generate poisonous gas and thus should be done outside.
I recommend having the bleach left open so the gas and pressure escapes when adding the stream of ozone, and leave it outside and far away for the duration of the time.
And continue this reaction over night or for 24h.
At this point the reaction should be complete.
And you can filter any precipitate, or evaporate of the water, natural sunlight and heat might work.

Reaction medium:
Favoring chlorate formation:
Ozone moderate excess, neutral to basic pH, moderate temperature.
Favoring perchlorate formation:
Ozone in major excess, elevated temperatures, continued oxidation past chlorate formation.

Basically take sodium hypochlorite bleach and heat it to 50-90C. Bubble a lot of ozone gas into it. Leave it open outside overnight or 24h.
Once done turn off the heat and ozone generator and let the sun evaporate the water, and or filter the precipitate.

Sodium Chlorate

$NaClO_3$

Molar mass: 106.44 g/mol
Pyro valence: -6
Melting point: 248-261℃
Boiling point: 300-400℃ (decomposes)
Sensitivity: Very insensitive.

Electrolysis procedure:[61]

(electrolysis of either sodium chloride, sodium hypochlorite or sodium chlorite)

An easy set up is to:
Take a jar that is air proof and drill holes in the lid. One hole for the electrodes and one hole for the funnel or tube for the chlorine gas.

The electrodes and funnel are then added. Use glue to hold them and to make the lid airtight. If you want to be able to remove the electrodes and funnel later, then use heat to melt the glue when done.

The funnel helps direct the chlorine gas. So it can be directed away from a person or to be neutralized. And it can also be used to direct the chlorine gas to react with something else.
For an example:
One can prepare an extra jar airtight jar with elemental sulfur, which the chlorine gas is led into.
This will produce sulfur chlorine (S_2Cl_2), which can be used to make acetic anhydride.

Alternatively just lead the chlorine gas into water.

Then to add sodium chloride solution to the jar, having some excess sodium chloride that isn't dissolved is fine, and close the lid.

Then starting the electrolysis, which is done by producing voltage between the electrodes, which generates an amperage.
Using 4.2 amps for 16 days is sufficient for a good yield.
Depending on the electrodes and the concentration of the solution, different voltage may be needed to achieve that amperage.

Once the electrolysis is complete, you're left with a very concentrated sodium chlorate solution. Some sodium chlorate may already be precipitating out.
Turn off the voltage, make sure it's not bubbling, and remove the lid.

[61] "A Sodium Chlorate Cell", Scrap Science, 10 Nov 2021, https://www.youtube.com/watch?v=N45DlWLQ218

To recrystallize the sodium chlorate, you simply heat the mixture and mix with a stir bar. If for whatever reason all the sodium chlorate doesn't dissolve, just add a little bit more water.
Side note: It is optional but if you suspect there's contaminates then just filter the mixture, like if there's clumps which don't look like sodium chlorate when all the sodium chlorate should be dissolved.

Once all the sodium chlorate is dissolved, increase the heat to evaporate away most of the water. A good amount is something like 50-70% of the water. Meaning evaporate 50-70% of the volume of the mixture.

Once most of the water has been evaporated, take the mixture off of heat and let it cool down. The sodium chlorate will precipitate out.

Once the mixture has cooled down, the sodium chlorate will have precipitated out and can then be filtered and collected.
Or heat and evaporate off the water.

Boiling procedure:

Dissolving sodium hypochlorite in water and boiling it for 5 hours, adding water if needed, causes a disproportionation reaction:

Sodium hypochlorite with the presence of heat turns into sodium chloride and sodium chlorate.

Boil off most of the water. Once it begins to precipitate, keep boiling off 50% of what remains.
Let the mixture cool down for 1 hour.
There might be possible precipitate, this should be filtered.
It can be gravity filtered, but this might take a long time.
Vacuum filtering is the fastest method of filtration.

Once filtered, recover the liquid, which is a sodium chlorate solution.
You can help precipitate the sodium chlorate by pouring it into a saturated solution of sodium chloride. (Basically prepare a beaker of water with so much salt more can't be dissolved, and then pour the chlorate solution into that.)
Then filter and collect.

[Basically boil bleach (the higher concentration hypochlorite the better) for several hours, adding water or more bleach when needed.
After 5 or so hours boil off most of the water to allow everything to precipitate.]

Ozonolysis procedure:

Reaction medium:
Favoring chlorate formation:
Ozone moderate excess, neutral to basic pH, moderate temperature.
Favoring perchlorate formation:
Ozone in major excess, elevated temperatures, continued oxidation past chlorate formation.

Basically take sodium hypochlorite bleach and use normal outside temperature. Bubble small amounts of ozone gas into it. Leave it open outside overnight or 24h.
Once done turn off the heat and ozone generator and let the sun evaporate the water, and or filter the precipitate.

Potassium Chlorate

$KClO_3$

Molar mass: 122.55 g/mol
Pyro valence: -6
Melting point: 356℃
Boiling point: 400℃ (decomposes)
Sensitivity: Very insensitive

Electrolysis procedure:[62] [63] (electrolysis of either potassium chloride, potassium hypochlorite or potassium chlorite)

An easy set up is to:
Take a jar that is air proof and drill holes in the lid. One hole for the electrodes and one hole for the funnel or tube for the chlorine gas.

The electrodes and funnel are then added. Use glue to hold them and to make the lid airtight. If you want to be able to remove the electrodes and funnel later, then use heat to melt the glue when done.

The funnel helps direct the chlorine gas. So it can be directed away from a person or to be neutralized. And it can also be used to direct the chlorine gas to react with something else.
For an example:

[62] "Potassium Chlorate Synthesis Two Ways", Apoptosis, 13 Jan 2024, https://www.youtube.com/watch?v=A1FxEg9MOag
[63] "A Potassium Chlorate Cell", Scrap Science, 29 Jun 2021, https://www.youtube.com/watch?v=CqMEnrQb5q8

One can prepare an extra jar airtight jar with elemental sulfur, which the chlorine gas is led into.
This will produce sulfur chlorine (S_2Cl_2), which can be used to make acetic anhydride.

Alternatively just lead the chlorine gas into water.

Then to add potassium chloride solution to the jar, try not to have any excess potassium chloride, meaning ideally have it all dissolved in the solution, and close the lid.

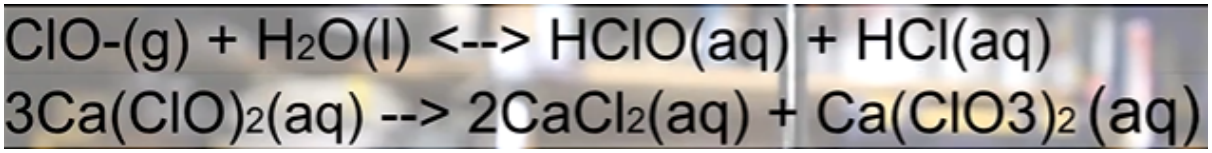
Then starting the electrolysis, which is done by producing voltage between the electrodes, which generates an amperage.
Using 3 amps for 16 days is sufficient for a good yield.
Depending on the electrodes and the concentration of the solution, different voltage may be needed to achieve that amperage.

Once the electrolysis is complete, you're left with a very concentrated potassium chlorate solution. Some potassium chlorate may already be precipitating out.
Turn off the voltage, make sure it's not bubbling, and remove the lid.

To recrystallize the potassium chlorate, you simply heat the mixture to a boil and add water until all of the potassium chlorate is dissolved.
Once everything is dissolved, take it off the heat and let it cool down to around 10 degrees celsius. This is fastest and most easily done by leaving the mixture in the fridge, covering the top with plastic wrap to prevent smell.
After several hours when the mixture is at ca 10 degrees celsius, almost all of the potassium chlorate will have precipitated out, so just filter and collect.

Boiling procedure:[62]

Dissolving potassium hypochlorite in water and boiling it for 5 hours, adding water if needed, causes a disproportionation reaction:



Potassium hypochlorite with the presence of heat turns into potassium chloride and potassium chlorate.
Let the mixture cool down for 1 hour.
There might be possible precipitate, this should be filtered.
It can be gravity filtered, but this might take a long time.
Vacuum filtering is the fastest method of filtration.

[Basically boil bleach (the higher concentration hypochlorite the better) for several hours, adding water or more bleach when needed.

After 5 or so hours, boil off most of the water to allow everything to precipitate.]

Ozonolysis procedure:

Reaction medium:
Favoring chlorate formation:
Ozone moderate excess, neutral to basic pH, moderate temperature.
Favoring perchlorate formation:
Ozone in major excess, elevated temperatures, continued oxidation past chlorate formation.

Basically take potassium hypochlorite bleach and use normal outside temperature. Bubble small amounts of ozone gas into it. Leave it open outside overnight or 24h.
Once done turn off the heat and ozone generator and let the sun evaporate the water, and or filter the precipitate.

Ammonium Chlorate

NH_4ClO_3

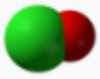
Molar mass: 101.49 g/mol
Pyro valence: -3
Melting point: 380℃ (decomposes)
Sensitivity: Very insensitive, when heating ammonium chlorate begins decomposing at 102℃.

Ammonium chlorate can in theory be generated by electrolysis or boiling of ammonium chloride solutions.
And ammonium hypochlorite and chlorite compounds are harder to come by.

Most commonly it is prepared by displacements of other chlorates.
Meaning you mix in a solution: ammonium nitrate and sodium chlorate, as an example.
The chlorate ion will attach to the ammonium and nitrate will join the sodium, producing:
Ammonium chlorate and sodium nitrate.

As one can easily make ammonium nitrate with ozone and ammonia reaction, using electricity. And get sodium chlorate by electrolysis of sodium chloride.
In theory one could generate ammonium chlorate by electricity, air, water, sodium chloride and ammonia.

Perchlorates

Chlorine oxidation state	−1	+1	+3	+5	+7
Name	chloride	hypochlorite	chlorite	chlorate	perchlorate
Formula	Cl^-	ClO^-	ClO_2^-	ClO_3^-	ClO_4^-
Structure					

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In fact at the range of perchlorate, substances like ammonium perchlorate are such strong oxidizers and have powerful enough redox such that they can be used in rocket fuel.

To achieve oxidation of chlorine containing compounds usually involves applying energy. The oxygen is often available in most mediums, in the air or water.
And so there are different methods of introducing energy to these materials to cause oxidation in an oxygen rich environment to oxidize the material.

These are the most common options:
1 Electrolysis in an unpartitioned cell of water.
2 Thermally decomposing the dry compounds.
3 Heating or boiling the compound in a water solution.
4 Ozonolysis (bubbling ozone gas) in a water solution with the compound.

What these methods do is that they apply just enough energy to trigger the oxidizing reaction, but not too much energy which causes decomposition and the loss of oxygen.

Chlorides are common salts which are found and purchased everywhere. And seawater naturally has a lot of sodium chloride.

Hypochlorites and chlorites are strong oxidizers often used for bleach and industrial bleaching processes. You can also find hypochlorites in pool sanitation products.

Meaning these are often found in bleach, pool tablets or other sanitizing or cleaning products.
But it should be noted when using these that there's a serious risk in generating poisonous chlorine gas.

Basically when working with bleach:
Do it in a well ventilated place with a fume hood, or ideally outside.
Don't add vinegar, alcohols (ethanol, methanol, acetone, isopropyl alcohol, etc) or ammonia to bleach, this causes an exothermic reaction and generates chlorine gas.
And be careful if you are going to attempt boiling bleach because this could as well generate poisonous vapors.

So one could start with regular salts or bleaches and from there oxidize these to chlorates or perchlorates.
Of course there's naturally an advantage to starting with the higher oxidized materials because it requires less time and energy to oxidize these to the desired level, as they are already oxidized to some degree.

Chlorates and perchlorate ions can switch places that is why some methods on the internet involve "displacement" reactions.
For example they might have calcium hypochlorite available, and decide to generate calcium chlorate, and then mix this in a water solution with sodium chloride or potassium chloride, to generate sodium chlorate or potassium chlorate.
A similar procedure can be done with perchlorate.

Make sure to check how many ions there are per atom.
For example with ammonium nitrate and sodium perchlorate:
$NH_4NO_3 + NaClO_4$, There is 1 NO_3 per NH_4 and 1 ClO_4 per Na.
Meaning you want to mix equal molar ratios. 1 Ammonium nitrate per sodium perchlorate.

But if you use potassium perchlorate instead:
$NH_4NO_3 + Ca(ClO_4)_2$, there's 1 NO_3 per NH_4 and 2 ClO_4 per Ca, So to balance this you need an extra ammonium nitrate.
$2\ NH_4NO_3 + Ca(ClO_4)_2 \rightarrow 2\ NH_4ClO_4 + Ca(NO_3)_2$

Electrodes for electrolysis: (suited for chlorates)

Titanium

Pros:
works really well
cons:
expensive

Mixed Metal Oxide (MMO)

Pros:
Best for chlorate
Cons:

Expensive

Platinum

Pros
Minimal erosion
Cons
Expensive
Needs minimum salt concentration to avoid erosion

Platinized

Pros:
Same as platinum but less expensive
Cons:
Same as platinum but usually doesn’t last as long

Graphite or Carbon (recommended, cheap and works fine, degrades a little over time but it's fine because carbon usually help oxidizers with the oxygen balance)

Graphite or carbon electrodes generally will degrade a little and may cause traces of carbon particles in the solution.
This is fine for the intents and purposes of making explosives. As carbon serves as a fuel. And most chlorates are oxidizers.
The only problem with degradation is that you might have to buy new ones, which is fine because they are very cheap.

Pros
Very cheap
Easy to acquire
Cons
Sensitive to certain pH
Bad at making electrical connections

Lead Dioxide (Second best, cheap and works really well, might require time to safely make it, considering it has poisonous lead, can also be used to make perchlorates)

Pros
Cheap
Very resistant
Works really well and can even produce perchlorates
Cons
Requires some labor to make

Lead is toxic

Can very easily be made at home.[60]
Melt lead into the form of a large flat surface (using any metal but copper).
Then performing electrolysis in dilute sulfuric acid, with lead anode (positive), and copper cathode (negative), at 0.1A, for a few hours.
The brown color disfiguration on the lead electrode indicated lead dioxide.

Regular metal

Meaning everyday items made out of metal. These can be used but might degrade very easily and so it is a very sacrificial usage.
One could just use metal spoons for electrodes if so desired, but needs to be open to the possibility that the spoons will rust and be destroyed in the process.
Pros
Cheap
Cons
Depends, possibly expensive in the long run

Electrodes for perchlorate production:

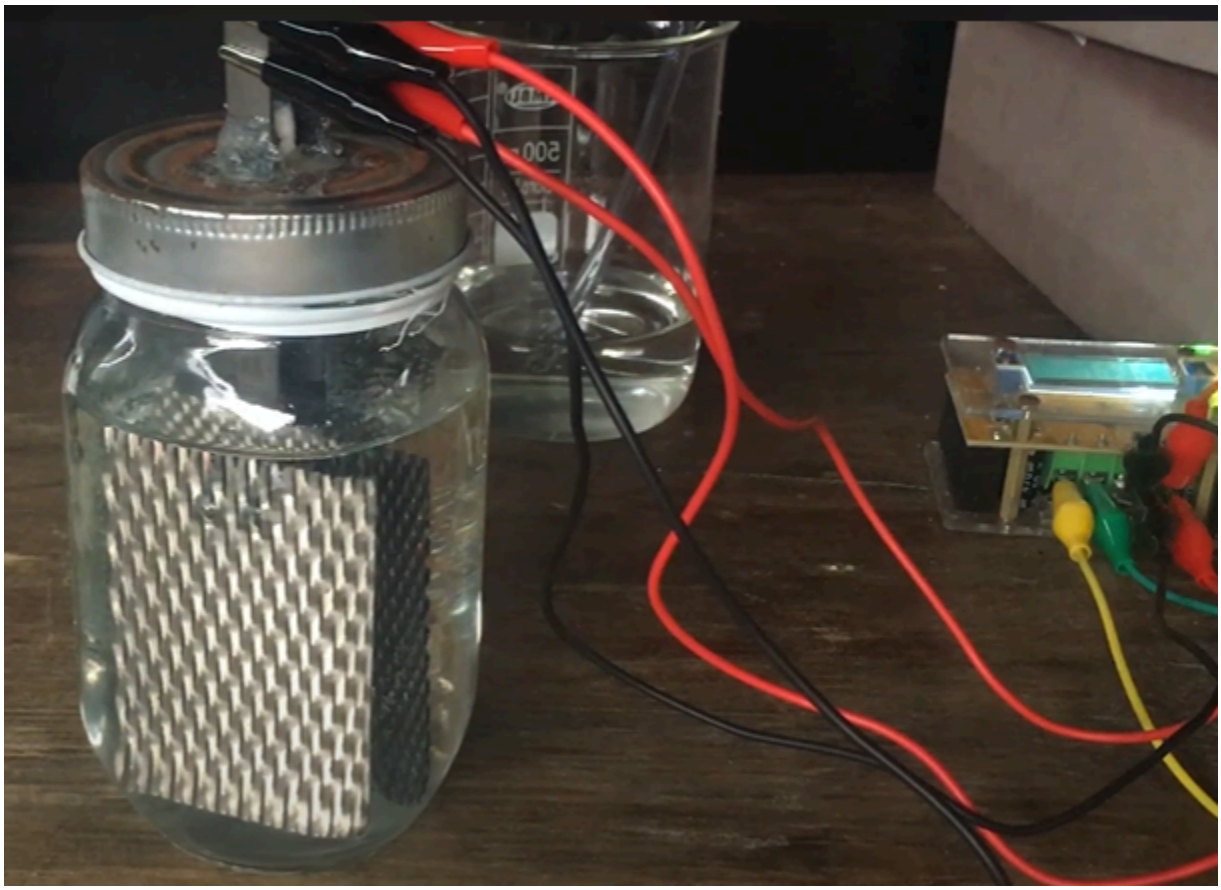
PbO2 electrode

Lead dioxide electrode, these are the ones needed to generate perchlorate by electrolysis.
Making your own lead dioxide electrode:[60]
Simply melt lead and pour it into a long bent shape, forming a long flat surface.
Any metal works except copper, so don't melt or pour lead into copper..
Then perform electrolysis with lead anode (positive) and copper cathode (negative), in dilute sulfuric acid solution, around 0.1A.
Perform this for a few hours, until the lead electrode turns brown indicating lead dioxide.

Melting and Boiling methods:
For the production of chlorates and perchlorates there are favorable conditions to increase the effectiveness and yield:
Higher temperatures, boil the solution or push the product close to decomposition temperature wise.
High concentrations, basically low water content, only add water based on need as to avoid decomposing the reactants.
Keep the pH between 5-9, ideally 6-7.
Catalyst metals are: copper, iron, nickel, etc.

In theory one could just boil bleach or melt pool tablets (containing hypochlorites or chlorites), but one can ideally control the other factors as well. And don't push the temperature to decomposition.

Again to generate perchlorates by electrolysis you need PbO2 electrodes.



To calculate the correct voltage to use:
You want 0.3 or more ampere per cm^2 area of working electrode.

Meaning you measure one side of the positive electrode, the anode. You measure width and height and calculate the surface area.
Then multiply that with 0.3 A. Which gives you the ampere you need.
You then change the voltage until you reach that amper.

Once the correct current is flowing you want to keep it for long enough. 1280-1800 AH (ampere hours) is more than sufficient to achieve perchlorates, if you are using PbO2 electrode. Otherwise it gives chlorates.
So take 1800 and divide it by the amount to ampere, this will give the most amount of hours you will need to run.

Example:

Width 10cm, height 10cm.
Area 100cm^2
0.3*100 = 30, 30A, change voltage until you achieve 30A
1800/30 = 60, and hold this for 60 hours.

As you can notice, larger surface area on the electrode increases the amount of ampere delivered, and thus reduces the reaction time.
So highly recommended to use a large flat electrode surface.
And keep this in mind if you are going to make your own PbO2 electrodes.

Lastly, perchloric acid is industrially made and sold by chemical suppliers, so if you can steal from them or buy with a business front. Then one could just buy perchloric acid and react it with ammonia, urea, aminoguanidine or nickel carbonate, etc.
Simply reacting 1:1 molar ratio of perchloric acid and other reactants achieves the reaction. And water can be used as the solution.
Otherwise it is a matter of electrolysis, thermal decomposition, or displacement reactions.

The boiling method:

This method is very straightforward to generate chlorates.
Basically boil bleach (the higher concentration hypochlorite the better) for several hours, adding water or more bleach when needed.
After 5 or so hours boil off most of the water to allow everything to precipitate.

The possibility of ozonolysis:

Ozone generators are easily found and bought online. These are often used to clean pools.
They generate the highly reactive gas ozone, which can react with hypochlorites to form chlorates or perchlorates.

Meaning in theory one could bubble ozone gas into sodium hypochlorite bleaches to oxidize these into chlorates or perchlorates.
This could generate poisonous gas and thus should be done outside.
I recommend having the bleach left open so the gas and pressure escapes when adding the stream of ozone, and leave it outside and far away for the duration of the time.
And continue this reaction over night or for 24h.
At this point the reaction should be complete.
And you can filter any precipitate, or evaporate of the water, natural sunlight and heat might work.

Reaction medium:

Favoring chlorate formation:
Ozone moderate excess, neutral to basic pH, moderate temperature.
Favoring perchlorate formation:
Ozone in major excess, elevated temperatures, continued oxidation past chlorate formation.

Basically take sodium hypochlorite bleach and heat it to 50-90C. Bubble a lot of ozone gas into it. Leave it open outside overnight or 24h.
Once done turn off the heat and ozone generator and let the sun evaporate the water, and or filter the precipitate.

Sodium Perchlorate

$NaClO_4$

Molar mass: 122.44 g/mol (anhydrous) 140.45 g/mol (monohydrate)
Pyro valence: -8
Melting point: 468℃ (anhydrous, decomposes) 130℃ (monohydrate, dries to anhydrous)
Sensitivity: very insensitive

Electrolysis of sodium chloride, sodium hypochlorite or sodium chlorite, using PbO2 electrodes. You want to apply 0.3A/cm^2 (amps per area of electrode). And you want to apply 1800 AH (amps per hour).[64]

Melting sodium chlorate, firstly heat to 100C to boil off water, when the temperature rises again it will start producing oxygen gas and decompose into sodium perchlorate, continue this for 30 min, before letting it cool down.[65]

Ozonolysis procedure:

Reaction medium:
Favoring chlorate formation:
Ozone moderate excess, neutral to basic pH, moderate temperature.
Favoring perchlorate formation:

[64] "The Simplest (But Most Expensive) Perchlorate Cell", Scrap Science, 9 Mar 2025 https://www.youtube.com/watch?v=cclQl6JeZOg
[65] "Lab Notes - Making Sodium Perchlorate Without Electrolysis, MIH0319, 18 Feb 2024, https://www.youtube.com/watch?v=BBjKIkzf9Tg

Ozone in major excess, elevated temperatures, continued oxidation past chlorate formation.

Basically take sodium hypochlorite bleach and heat it to 50-90C. Bubble a lot of ozone gas into it. Leave it open outside overnight or 24h.
Once done turn off the heat and ozone generator and let the sun evaporate the water, and or filter the precipitate.

Potassium Perchlorate

$KClO_4$

Molar mass: 138.55 g/mol
Pyro valence: -8
Melting point: 610℃ (decomposing starts at 400℃)
Sensitivity: very insensitive

Electrolysis of potassium chloride, potassium hypochlorite or potassium chlorite, using PbO2 electrodes. You want to apply 0.3A/cm^2 (amps per area of electrode). And you want to apply 1800 AH (amps per hour).[66]

Melting potassium chlorate, firstly heat to 100C to boil off water, when the temperature rises again it will start producing oxygen gas and decompose into sodium perchlorate, continue this for 30 min, before letting it cool down.

Ozonolysis procedure

Reaction medium:
Favoring chlorate formation:
Ozone moderate excess, neutral to basic pH, moderate temperature.
Favoring perchlorate formation:
Ozone in major excess, elevated temperatures, continued oxidation past chlorate formation.

Basically take potassium hypochlorite bleach and heat it to 50-90C. Bubble a lot of ozone gas into it. Leave it open outside overnight or 24h.
Once done turn off the heat and ozone generator and let the sun evaporate the water, and or filter the precipitate.

[66] "Perchlorate production via electrolysis, with PbO2 anode, Feanor Forges, 18 Apr 2021, https://www.youtube.com/watch?v=cxmuHoh7ObM&t=1s

Ammonium Perchlorate

NH_4ClO_4

Molar mass: 117.49 g/mol
Pyro valence: -5
Melting point: Exothermic decomposition before melting at >200℃.
Sensitivity: Very insensitive. Strong heating may lead to an explosion.

Ammonium perchlorate can in theory be generated by electrolysis. Needs PbO2 electrode. You want to apply 0.3A/cm^2 (amps per area of electrode). And you want to apply 1800 AH (amps per hour).
And ammonium hypochlorite and chlorite compounds are harder to come by and use for electrolysis.
One could also try electrolysis of ammonium chlorate.
Or by melting ammonium chlorate.

Most commonly it is prepared by displacements of other perchlorates.
Meaning you mix in a solution: ammonium nitrate and sodium perchlorate, as an example.
The perchlorate ion will attach to the ammonium and nitrate will join the sodium, producing:
Ammonium perchlorate and sodium nitrate.

As one can easily make ammonium nitrate with ozone and ammonia reaction, using electricity. And get sodium perchlorate by electrolysis of sodium chloride.
In theory one could generate ammonium chlorate by electricity, air, water, sodium chloride and ammonia.

Another example is ammonium perchlorate by displacement of ammonium chloride and sodium perchlorate. [67] [68]
Equal molar ratio, and dissolve and mix these in water.

Lithium Perchlorate

$LiClO_4$

Molar mass: 117.49 g/mol

[67] "Ammonium perchlorate synthesis", Feanor Forges, 25 Jun 2021, https://www.youtube.com/watch?v=QvFt8myD7Gs
[68] "Transforming Table Salt into Rocket Fuel: Ammonium Perchlorate", jam_kemist, 18 apr 2025 https://www.youtube.com/watch?v=gf1AoHq5Zjw

Pyro valence: -8
Melting point: Exothermic decomposition before melting at >200℃.
Sensitivity: Very insensitive. Strong heating may lead to an explosion.

Lithium perchlorate can be found in lithium-ion batteries

Lithium perchlorate can in theory be generated by electrolysis of lithium chloride. Needs PbO2 electrode. You want to apply 0.3A/cm^2 (amps per area of electrode). And you want to apply 1800 AH (amps per hour).
And lithium hypochlorite and chlorite compounds are harder to come by.
One could also try electrolysis of lithium chlorate.
Or melting lithium chlorate.

Most commonly it is prepared by displacements of other perchlorates.
Meaning you mix in a solution: lithium chloride and sodium perchlorate, as an example.
The perchlorate ion will attach to the lithium and chloride will join the sodium, producing:
Lithium perchlorate and sodium chloride.
Equal molar ratio, and dissolve and mix these in water.

Nickel Aminoguanidine Perchlorate (NAP) ([bis] Aminoguanidine Ni Diperchlorate)

$NiC_2H_{12}N_8Cl_2O_8$

Molar mass: 405.76 g/mol
Pyro valence: +3 (my estimate assuming normal end products)
Detonation velocity: ca 8000 m/s
Sensitivity: Very sensitive to shock friction and heat, and critical mass is a single crystal. Meaning essentially any amount can detonate to outside force or heat.

Introduction (from reference 69):

Nickel Aminoguanidine Perchlorate, abbreviated NAP, is a short name for the full name of:
[bis] Aminoguanidine Ni Diperchlorate.
Its appearance is that of red crystals.

NAP is a newly discovered primary explosive that for the moment does not have any scientific literature surrounding it. But it has some potentially promising features.

NAP is also less sensitive than lead azide the most commonly used primary explosive. NAP also has an approximate detonation velocity around 8000 m/s, which is higher than that of the lead azide, with 5180 m/s.

NAP is non-hygroscopic. This means that NAP should be kept away from water, to avoid decomposition. Generally keep explosives away from water, as water slowly decomposes most explosives. This process of decomposing explosives with water is called remediation.

NAP detonates at 270 degrees celsius. The critical diameter is: single crystal. This means that any amount of NAP, even done to a single crystal, will detonate when heated to 270 degrees celsius.
Keep therefore NAP away from potential heat sources like hot plates, especially when doing chemistry.

NAP has been observed to be able to detonate secondary explosives with as little as 5 mg of mass.

A possible danger with NAP is that nickel carbonyl (otherwise known as nickel tetracarbonyl or tetracarbonylnickel) may be part of the decomposition pathway.
Nickel carbonyl is an extremely poisonous gas, exposure of 3 ppm for 10 min can be lethal.
So even though there's no real information that nickel carbonyl is any realistic threat from NAP decomposition. It's important to keep in mind that the fumes from NAP decomposition or explosion could be dangerous.
The half life of nickel carbonyl is around 40 seconds. So even if you exploded NAP right under your nose, just don't breathe instead hold your breath and walk away.

Dugan's NAP Simplified 1 gram recipe[69]:

Chemicals:
Aminoguanidine Bicarbonate 1g [7 mmol]
$CH_6N_4*H_2CO_3$

Ammonium Perchlorate 0.86g [7 mmol] (400 micron)
NH_4ClO_4

Nickel Carbonate 0.43g [3.5 mmol]
$NiCO_3$

Procedure:
1 Put all the chemical reactants into the same vessel and mix them up.
2 Take a beaker and add 25-30ml of water.
3 Add a stirring bar to the beaker and place it on a hot plate.

[69] "NAP [primary explosive]", YouTube, Dugan Ashley, 18 Sep 2023
https://www.youtube.com/watch?v=Y0TJvbuF4yI

4 Heat up the water to the boiling point.
5 As soon as the water starts to boil, start the stirring bar and add the entire mixture of reactants.

The mixture will start foaming and off gassing, the color will become a lime green, then brown and finally red once at the completion of the reaction.
The reaction time, starting at the boiling of the water, is around 5-7.5 minutes.

6 Let the mixture boil for 7 and a half minutes, then take it off the hot plate to cool down.
7 Let the mixture cool down for 1-2 hours at most.
8 Once the mixture has cooled down and precipitated the crystals, dump it on a coffee filter with a paper towel underneath to dry them off.

If there's a lot of unreactant material left in the beaker after the reaction then decant the liquid from the unreactants which gather at the bottom.
This is done after the reaction time and before letting the NAP precipitate out of the liquid.

Dugan's INAP[70]:
Using isopropanol alcohol instead of water as solvent has several advantages. The exact same routine is used but with isopropanol alcohol instead of water, and it creates a very different type of NAP.
This version of NAP can be called INAP.

Firstly using isopropanol alcohol increases the yield, one achieves well over a gram using the exact same routine.
Instead of being a red crystal, INAP is a salmon colored powder.
It is much more stable and packable.
Its mechanical sensitivity is much less than that of regular NAP. For example it requires more or harder hammer hits to detonate and it is pretty much insensitive to friction from a 4lbs hammer.

The firing efficiency of INAP on the other hand is less than that of regular NAP, meaning it requires more to trigger secondary explosives.
One should use over 25mg if they aim to detonate explosives in the same device using INAP.

[70] "NAP Advancement", Youtube, Dugan Ashley, 22 May 2024
https://www.youtube.com/watch?v=VR_9GZlIRRo

It is approximately between lead azide to DDNP in the masses used to trigger base charges in detonators.

Using regular 91% drug store isopropanol alcohol is fine.
But it is recommended to use slightly more solvent when it is isopropanol alcohol. In the previous recipe it is recommended between 25-30ml water.
One should use approximately 35ml isopropanol alcohol [91%] when doing INAP.

Otherwise the procedure is exactly the same, bring isopropanol alcohol to a boil (which is done quicker because of the lower boiling point than water) and then dump all the reactants.

To make the solvent boil faster, and preserve more of the solvent, one can use a cover on the glassbreaker, like a glassplate.
This is so that one faster reaches boiling point, then you remove the cover or glassplate, add the reactants, and cover again.
Using covers which preserve heat and solvent decreases the reaction time which means holding the reaction at boiling point for 5 min is often sufficient, rather than holding 5-7.5min which is necessary without covering.

After the reaction time, simply take it off heat and pour it onto a coffee filter and let it dry. The isopropanol alcohol makes it dry very fast.

One can make a detonator entirely using INAP if they wanted.

Dugan's UNAP (from reference 70):
UNAP (ultrasonicated NAP) is NAP which is precipitated while under ultrasonic frequencies. To achieve this the routine is exactly the same but instead of letting the product precipitate alone for 1-2 hours, you place it on a room temperature ultrasonic bath for 10 min.

The advantages of UNAP are good. It is less sensitive than NAP, especially in friction. And it is more powerful and efficient than NAP.

So overall it is a superior product. You achieve it faster, it is safer to handle and more powerful.
Ideally one uses ultrasonic frequencies to precipitate NAP.

One can easily buy a 20 dollar jewelry cleaner which is an ultrasonic bath.
The frequency used should be 42 kHz and the water should be 20 C and/or room temperature, not too cold.

So the procedure is almost the same and very simple:
Bring water to a boil with cover.
Remove the cover and dump all the reactants, add the cover again.

Let it react for 5 min.
Then decant and collect the liquid if there's unreactant material at the bottom.
Prepare 20 degree celsius or room temperature water and place in the ultrasonic bath, and start it around 42kHz.
Then add the beaker with liquid to the ultrasonic bath and let it sit for 10 min.
After 10 min, most of the product gather at the bottom of the beaker, decant the liquid and place the UNAP at the bottom on dry.

If you want one can place the extra liquid to dry for 24 hours for extra crop. This extra product won't be exactly like UNAP but will still be affected by the initial ultrasonication.

To dry NAP, INAP or UNAP with heat use around 60 degrees celsius.

Urea Perchlorate

$CO(NH_2)_2 * HClO_4$

Molar mass: 159.51 g/mol
Pyro valence: -2
Melting point: 83℃
Sensitivity: Generally insensitive.

Perchloric acid method:

$CO(NH_2)_2 + HClO_4 \rightarrow CO(NH_2)_2 \cdot HClO_4$

This reaction doesn't need to be dry, so one can just divide the perchloric acid weight or volume by concentration to calculate how much they need.

For 100g urea perchlorate:
38g Urea
63g or 35.6mL Perchloric acid (100% conc)
(90g or 51mL Perchloric acid (70% conc), common concentration)

Simply add small portions of the urea at a time, stirring and dissolving it until everything is added and reacted.
Then heat to evaporate off the water.

Perchlorate salt and muriatic acid method:

$$NaClO4 \cdot H2O + CO(NH2)2 + HCl \rightarrow CO(NH2)2 \cdot HClO4 + NaCl + H2O$$

For 100g urea perchlorate:
77g Sodium perchlorate (monohydrate)
38g Urea
23g or 52.7mL HCl (100% conc)
(77g or 176mL HCl (30% conc), common concentration)

Simply dissolve all the sodium perchlorate in the HCl acid solution, before slowly adding urea in portions. Once everything is added and reacted you can give gentle heat to evaporate the water.

Hydrazine and its derivatives

Hydrazine Sulfate

$[N_2H_5][HSO_4]$

Molar mass: 130.12 g/mol
Melting point: 254℃

Hydrazine is commonly used as a precursor for different explosives.

Dugan says:[71]

Pure hydrazine is very toxic. The gist is that if you smell it you are already over exposed. So when ever handling any type of hydrazine you need to have a well ventilated space and ideally a fume hood.

[71] "Hydrazine Sulfate", Dugan Ashley, 5 Jun 2024, https://www.youtube.com/watch?v=SwFduB27qzo

The procedure that Dugan shows is for hydrazine sulfate, which is more safe to handle. Though it should be noted that there's two moments of great foam build up.
Meaning this procedure has a very great risk of spillage as well.
So it is strongly recommended to have a large ice bath with some space in case it spills over, or maybe even have an extra container beneath the ice bath.
Spillages can be cleaned up using bleach.

All this to say, you need to have ventilation, fume hood, gloves, and a container for possible spillage.

Procedure:

This procedure produces 58-60g of hydrazine sulfate. And it is more complicated and demanding than most.
Firstly we are preparing two solutions.

Solution 1:
54g Urea
46mL H_2O
1g Gelatine

Solution 2:
76g NaOH
68mL H_2O
434.7g NaOCl 12.5% (bleach)

Start by cooling all reactants, for all solutions. At least below 10°C. Putting them in a fridge will get them to ca 8°C, which is fine. But closer to zero is better.

Solution 1:
Add urea to water, stir until it dissolves, adding slight heat helps dissolve it, and then add the gelatine.

Solution 2:
First add the sodium hydroxide to the water, this is exothermic, meaning it generates heat. And you need to let the sodium hydroxide dissolve, and let the mixture cool down before continuing. Because heating bleach gives poisonous fumes.
When the sodium hydroxide is added and has given off all of its heat, and cooled below 10°C, then you add the bleach, and again let it cool below 10°C. As cool as possible.

Reaction:
1 Place solution 1 in a large 1 liter beaker or even larger beaker. And place this on an ice bath.
2 Add solution 2 to a titration funnel.
3 Drip solution 2 into solution 1. This will generate foaming. If it becomes too much, stop the stirring and let it cool down, otherwise spilling some foam into the ice bath or other container is fine.

4 While the reaction is going. You heat up water for a hot water bath somewhere around 80°C. And you keep this on standby.
5 Once all of solution 2 has dripped into solution 1. You immediately take it off the ice bath and place it on the hot water bath. Drive the temperature up to 72°C. Keep stirring.
(Hydrazine production is very different, first a cold moment, then hot moment, and then cold again)
6 As soon as you reach 72°C, take it off the hot water bath and place it back on the ice water bath.
Aim towards 0°C.

Extraction: (when the mixture is cooled)

188 ml HCl 32% conc
[-10°C] (doesn't need to be negative, colder helps but 0-10°C is sufficient)

115g H2SO4 85%
[chilled]
(one can also use diluted sulfuric acid, remember to divide by concentration to account for new volume)

(note: prepare the concentrations first as they can generate heat, and then cool them before using them for the extraction of hydrazine sulfate.)

1 Add plastic wrap on top of the mixture with a rubber band to help contain future foamage. Cut small holes for the thermometer, stirring rod, and funnel.
2 Prepare the titration funnel with the hydrochloric acid and start dripping it into the mixture. Keep temp below 10°C. Once everything is added:
3 Then prepare the titration funnel with the sulfuric acid and start dripping in that as well. Keep below 25°C. Keeping as cool as possible is the best, so ideally stay under 10°C.
(Dangerous fumes are very likely here, and extreme foam build up.)
If there's too much foam, stop adding acid, let it cool down, and let the foam drop, before starting to add again.
Once everything is added, the hydrazine sulfate should have precipitated, if it hasn't or is still clearly doing so then let it sit for a while longer.

Filtration:
1 Pour off into a filter. Suction or vacuum filtering works to quicker dry it.
2 Place it in a small amount of water, wash it by shaking it.
3 Filter again.
4 Place it in a small amount of alcohol (ex isopropyl alcohol) and wash it.
5 Filter again.
6 Pour it out of any filter and organic material and place it in a glass bowl for its final drying. This is important because when it has dried any organic material like paper filter will be absorbed and contaminate the product.
So after the last filtering suction most of the moisture then place it on or in a glass bowl.
7 Heat the glass container carefully to around 100°C to evaporate the water, leaving a dry product.

Nilered has a procedure using:[72]
500mL 5% bleach (sodium hypochlorite)
0.75g gelatin
22g urea
100mL 50% sulfuric acid

His yield was: 20.25g (48% of theoretical yield)

This routine likely has worse yield than that of Dugans. But this routine does use more easily found low concentration bleach and sulfuric acid, so it's easier to prepare in that regard.

Nickel Hydrazine Nitrate (NHN)

$H_{12}N_8NiO_6$

Molar mass: 278.839 g/mol
Pyro valence: +1
Density: 0.8g/cm^3 Detonation velocity: 3600 m/s
Density: 1.7g/cm^3 Detonation velocity: 7000 m/s RE factor: 1.05
Sensitivity: Medium sensitivity to shock and friction, borders between being primary and secondary. Rapid heating makes it explode. Cannot be boiled, explodes instead.

NHN is made by reacting nickel(II) nitrate and hydrazine or hydrazine sulfate. Using the safer hydrazine sulfate the reaction is:[73]

$3\ [N_2H_5][HSO_4] + Ni(NO_3)_2 \rightarrow [Ni(N_2H_4)_3](NO_3)_2 + 3\ H_2O$

For 100g nickel hydrazine nitrate:
134g Hydrazine sulfate
63g Nickel(II) nitrate
Procedure:
1 Prepare a solution of hydrazine sulfate.
2 Add small amounts (few grams or milligrams) of sodium hydroxide while measuring or testing the pH. The goal is to have 7-8pH, not higher or lower.
So add just enough sodium hydroxide to achieve this.
3 Once set, raise the temperature to 60°C, and start stirring while dripping in the nickel(II) nitrate solution.

[72] "Making Hydrazine Sulfate from Urea and Bleach", Nilered, 19 Feb 2016, https://www.youtube.com/watch?v=PCovDr4FVNQ
[73] "Nickel Hydrazine Nitrate", Apoptosis, 13 Jul 2023, https://www.youtube.com/watch?v=enJAVGGTPQ4

A sign that you have added enough nickel(II) nitrate is that the solution turns green showing excess of nickel(II) nitrate, rather than blue or violet color.
4 Once everything is added or enough has been, filter the NHN. And wash the NHN in the filter with cold water and alcohol a few times.
5 Let most of the moisture out before placing it on a glass surface to air dry the rest.

Nickel(II) nitrate can be made by reacting nickel with nitric acid, or nickel oxide with nitric acid, or nickel hydroxide with nitric acid.
$Ni + 2\ HNO_3 + 5\ H_2O \rightarrow Ni(NO_3)_2 * 6\ H_2O$

The molar ratios are the same which nickel variant you use.
1:2.

For 100g nickel(II) nitrate:
59g Nickel metal
or
41g Nickel oxide
or
51g Nickel hydroxide

69g or 45.7mL HNO_3 (100% conc) (using dilute nitric acid is fine)

To generate nickel(II) nitrate:
Dissolve the nickel carrying compound in nitric acid, this may take a long time especially if doing the pure metal.
Once finished you are ready to use this solution to make nickel hydrazine nitrate.

Tetrazene

$C_2H_6N_{10}*H_2O$ (1-(5-tetrazolyl)-3-guanyl tetrazene hydrate)

Molar mass: 188.15 g/mol
Pyro valence: +10 (estimate assuming normal end products)
Density: 1.7 g/cm^3 Detonation velocity: 4000 m/s
Sensitivity: High sensitivity to shock and friction. Tetrazene decomposes rapidly at 90°C.

Pretty weak explosive. Though it initiates good, a larger quantity, confined and pressed for max density, could probably detonate decently.
But the synthesis is extremely easy and safe to do.

For 25g tetrazene:[74]
242ml Vinegar (6% acetic acid)
458mL Water
15g Aminoguanidine or 34g Aminoguanidine Bicarbonate
27.6g Sodium nitrite

Procedure:
1 Mix the vinegar and water.
2 Add stirring and elevate the temperatures to 30-40°C.
3 Add the aminoguanidine compound.
4 Add the sodium nitrite.
5 Reaction time: 2 hours.
6 Put it in the fridge and let it cool down close to 0°C.
7 Once cooled down, filter and collect the tetrazene.

Persulfates

Persulfates are very strong oxidizer compounds. They are themselves not particularly explosive or flammable, making them safe to handle on their own.
But when in oxygen balanced composition with fuels (often for example organic material like paper or metal fuels like aluminium) it becomes combustible.

So persulfates needs to be oxygen balanced with a fuel and needs pressing for density and confinement to achieve efficient explosive power.
Unlike some secondaries that are sufficiently powerful on their own without balancing composition or pressing or confinement.
Persulfates needs these to be efficient.

The persulfates are:
Sodium persulfate
Potassium persulfate
Ammonium persulfate

Generally stated they are prepared by electrolysis of a sulfate or bisulfate salt in sulfuric acid.
So these oxidizers are great to make if you have alot of extra sulfuric acid and not alot of nitric acid.

The conditions for electrolysis:

1 Partitioned cell (anode and cathode cells with bridge)
2 High concentration sulfuric acid

[74] "Tetrazene synthesis from Vinegar (and other chemicals), DBX Labs, 8 Jan 2020, https://www.youtube.com/watch?v=9YWmejywBHg

3 High bisulfate content is ideal but sulfates also work
4 Low temperatures 0-15℃
5 0.3-0.7 A/cm^2 (ampere per surface area of anode) (this is just a recommended range, one could use more and there are papers suggesting even going 1.5A/cm^2) (but notice, higher current increases production rate, but decreases current efficiency with side reactions and increases heat)
6 72 Ah (ampere hours, the amount of amperes applied for each hour times the amount of hours) (may need more)
7 PbO2, mixed metal oxides or platinum are common and used electrodes.
8 For extraction and purification one should only use ice cold water, or gentle heat. Because of the strong reactive oxidizing nature of persulfate salts you can't use alcohols or many other solvents, and no strong heat, as this can decompose or reduce the persulfate.

Sodium persulfate

Na2S2O8

Molar mass: 238.10 g/mol
Pyro valence: -6
Density: 2.601 g/cm^3
Melting point: 180℃ (decomposes)
Solubility in water: 55.6 g/ 100mL (20℃)

Can be recrystallized in water. But it is highly recommended when dissolving sodium persulfate one uses mild heat. And only mild heat as well when evaporating some of the water to help precipitate and resolidify the persulfate again.
Meaning, mix and dissolve in gently heated water, evaporate off some water, cool down to zero C and filter.

Procedure:
1 Perform electrolysis of sodium sulfate or sodium bisulfate in sulfuric acid. Using "the conditions for electrolysis" in the "Persulfates" chapter.
2 Cool down the mixture close to 0℃ and filter the persulfate salt.
3 Wash the persulfate salt in the filter with cold water a few times.
(4 Optional recrystallization. Do this if you intend to do really long term storage.)

Potassium persulfate

K2S2O8

Molar mass: 270.322 g/mol
Pyro valence: -6

Density: 2.477 g/cm^3
Melting point: < 100℃ (decomposes)
Solubility in water: 1.75g/100mL (0℃), 4.49g/100mL (20℃)

More prone to decompose because of heat. And less solubility in water. Both make it really hard to recrystallize potassium sulfate.
You can dissolve small amounts of potassium persulfate in some water and then pour it out in ethanol. Potassium persulfate is insoluble in ethanol.
So after that you just filter and wash with cold water.

Procedure:
1 Perform electrolysis of potassium sulfate or potassium bisulfate in sulfuric acid. Using “the conditions for electrolysis” in the “Persulfates” chapter.
2 Cool down the mixture close to 0℃ and filter the persulfate salt.
3 Wash the persulfate salt in the filter with cold water a few times.
(4 Optional recrystallization. Do this if you intend to do really long term storage.)

Ammonium persulfate

(NH4)2S2O8

Molar mass: 228.18 g/mol
Pyro valence: 0
Density: 1.98 g/cm^3
Melting point: 120℃ (decomposes)
Solubility in water: 80g/100mL (25℃)

Can be recrystallized in water. But it is highly recommended when dissolving ammonium persulfate one uses mild heat. And only mild heat as well when evaporating some of the water to help precipitate and resolidify the persulfate again.
Meaning, mix and dissolve in gently heated water, evaporate off some water, cool down to zero C and filter.

Procedure:
1 Perform electrolysis of ammonium sulfate or ammonium bisulfate in sulfuric acid. Using “the conditions for electrolysis” in the “Persulfates” chapter.
2 Cool down the mixture close to 0℃ and filter the persulfate salt.
3 Wash the persulfate salt in the filter with cold water a few times.
(4 Optional recrystallization. Do this if you intend to do really long term storage.)

Picrates and Phenol Derivatives

Picric Acid (2,4,6-Trinirophenol) (TNP)

$C_6H_3N_3O_7$

Molar mass: 229.10 g/mol
Pyro valence: +6
Density: 1.71g/cm^3 Detonation velocity: 7350 m/s RE factor: 1.17
Melting point: 122.5℃
Boiling point: >300℃ (explodes)
Solubility in water: 12.7g/L
Sensitivity: Medium sensitive to shock and friction. Recommended to store wet to minimize risk of explosion.

Notice: Picric acid is yellow and very prone to stain anything and everything yellow.
So mind how you touch and handle the substance to avoid staining things you wouldn't wanna stain.

Phenol method:

$C_6H_6O + H_2SO_4 + 3\ HNO_3 \rightarrow C_6H_3N_3O_7$

For 100g TNP:
41g Phenol
90g or 49mL Sulfuric acid (100% conc)
82.5g or 54.6mL Nitric acid (100% conc)

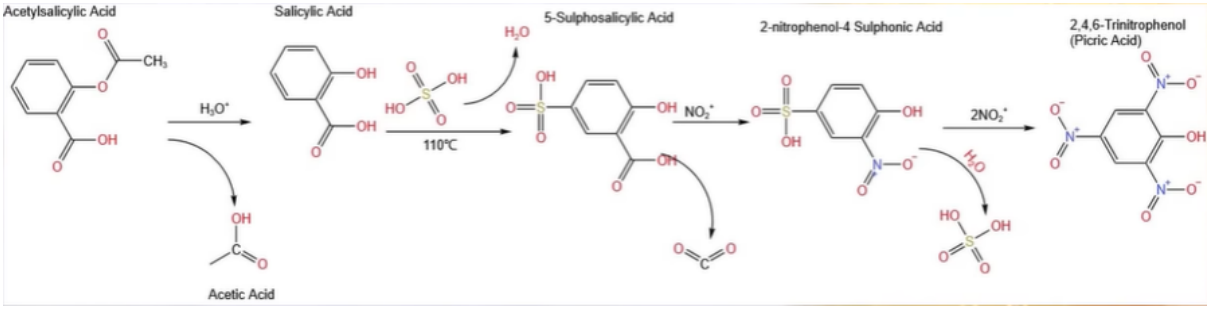
1 Prepare concentrated sulfuric acid on an ice bath. Keep below 10C.
2 Add phenol in small portions slowly while stirring.
3 Once everything is added and dissolved. Prepare a titration funnel with concentrated nitric acid.
4 Slowly drip nitric acid into the mixture while stirring. Mind the temperature.
If it gets above 10 stop adding. If it continues rising without addition and gives other signs for runaway then dump the reaction in water. Dumb-bucket. Whatever TNP made will precipitate.
5 Once everything is added, let it react for 30 min on ice bath.
6 Then remove the ice bath and let it react for 30 min at room temperature.
7 Pour out the solution in large amounts of cold water, the TNP will precipitate.
8 Filter the TNP, and wash it with cold water in the filter a few times.

Recrystallization:
1 Dissolve TNP in large amounts of water. Giving gentle heat.
2 Once dissolved, place the beaker in a fridge and cool the water close to 0C.
3 Let it sit for a day. So the TNP can precipitate.
4 Filter and wash with cold water a few times.
5 For storage, leave the TNP somewhat damp. For immediate use, evaporate the water with gentle heat.

(It is safer to store TNP when it is damp or slightly wet. When you intend to use it you can heat it so the water evaporates.)

Aspirin method:

This route yields 20g of TNP, using its reactant amounts.
If you want to prepare more then just multiply the amounts, like for 100g multiply by 5.



Aspirin is also known as acetylsalicylic acid (ASA).
And can be extracted from aspirin tablets:
1 crush the tablets into powder. can use electric blender, pill crusher, hand mill or mortar
2 dissolve the powder in warm isopropyl alcohol.
3 filter the powder and the liquid. recommended vacuum filter.
4 collect the liquid.

The liquid contains the ASA which will be used to make picric acid.
The tablet powder could also be saved as it is often made out of corn starch. Starch can be nitrated to nitrostarch.

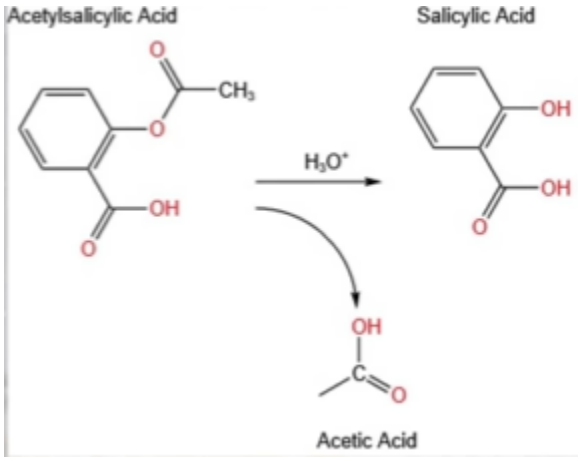
5 Evaporate off the isopropyl alcohol. use minimal heat and a recrystalization dish. have distillation station if so desired to keep the isopropyl alcohol.

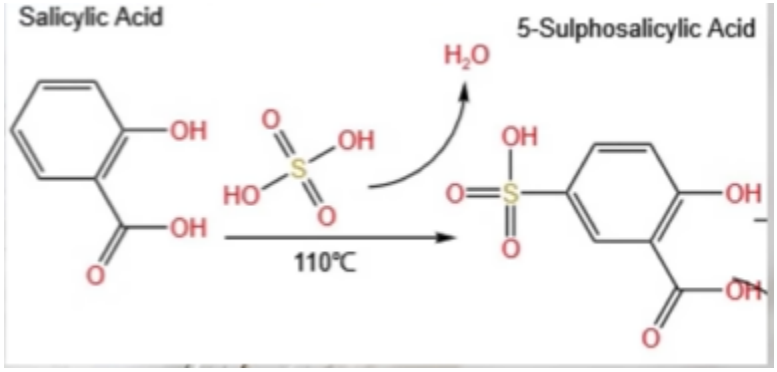
As the isopropyl alcohol evaporates, a white powder will crystallize which is the acetylsalicylic acid.
The remaining ASA powder may be a bit damp, so leave to air dry, or vacuum dry it.

6 weigh out, 20 grams of acetylsalicylic acid, 80 ml of 98% sulfuric acid.

7 Add the sulfuric acid to a beaker, and stir heavily, preferably with a stirring bar, while slowly adding the ASA.
This will dissolve some of the ASA.

8 Move the solution to a hotplate and heat it to 110°C. This will dissolve the ASA fully.
Hold this for just under an hour. / Hold this for an hour.





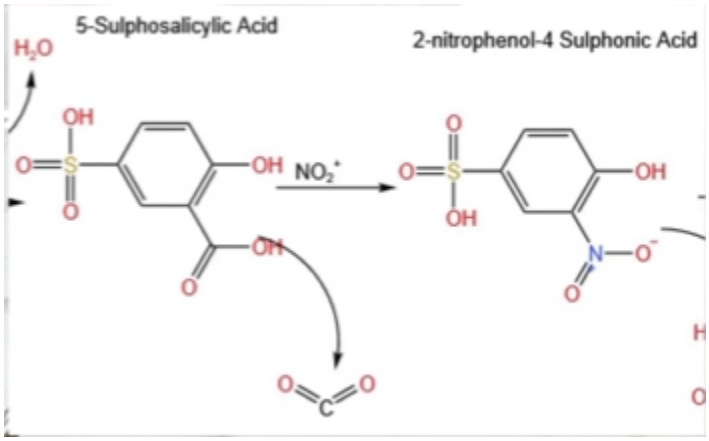
9 Then let the mixture cool to 90°C.

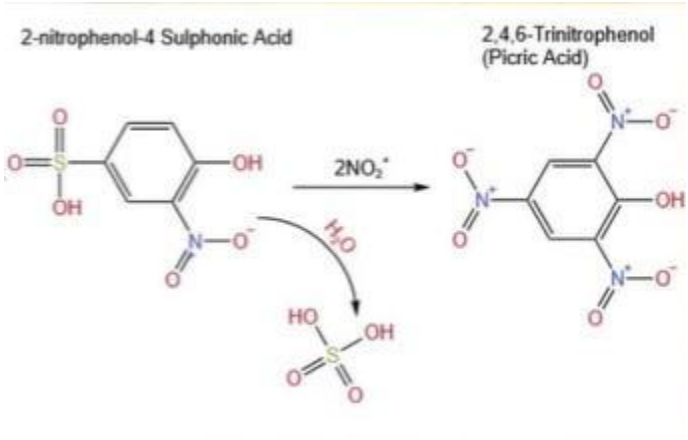
10 Add 40 g of sodium nitrate. Do this slowly with small amounts, while stirring.
44-ish g of potassium nitrate works also.

This reaction is extremely exothermic. It will cause a lot of poisonous NO_2 gas.

The reaction also increases in volume due to all the bubbling, so don't have it filled to the brim to begin with.
Try and keep the temperature below the max of 120°C.
Meaning slowly and periodically add small amounts of sodium nitrate.
Dumping it all in there will cause an immediate run away, most likely.

When you notice that the mixture cools down, and adding sodium nitrate doesn't cause the gas release, and you notice precipitation, then it is ok to increase the heat.
Increase it to about 125°C





11 Once the mixture stops reacting, and spewing red NO_2 gas, let the mixture cool down to room temperature.
The mixture will become green, and picric acid precipitate will form.

12 Slowly and ice cold water in small amounts to dissolve as much as possible. Notice there is still enough sulfuric acid present to cause an exothermic reaction with the water and boil the mixture.

13 Vacuum filter the mixture, picric acid is very insoluble so essentially everything will be collected.

To recrystallize the picric acid:

14 Add the picric acid to 1 liter of water.

15 Use an automatic stirring bar, and stir the mixture, while increasing the temperature until everything is dissolved.

16 Once everything is dissolved, take it off the heat and cool it down.

17 Let the mixture sit for 1 day, the picric acid will start to precipitate and to crystallize.

18 The next day use a glass rod to break the crystals into small pieces.

19 Vacuum filter this again, and collect the crystals.

20 Let the crystals air dry, or vacuum dry, but do not dry them fully.

Completely dry picric acid is very capable of exploding.
It is preferable therefore to keep it damp, wet to some degree.
When storing this, it should only be done in glass or plastic containers.
This is because picric acid will readily react with any metal to make metal picrate salts which are very sensitive explosives.

Notice also that picric acid is prone to stain anything with its yellow color and it is very hard to get off.

Sodium picrate

$C_6H_2N_3NaO_7$

Molar mass: 251.09 g/mol
Pyro valence: +6
Sensitivity: High
Formula:
$Na_2CO_3 + 2\ C_6H_3N_3O_7 \rightarrow 2\ C_6H_2N_3NaO_7$

For 100g sodium picrate:
91g Picric acid
21g Na_2CO_3 (anhydrous)
(or 57g Na_2CO_3 (decahydrate))

Procedure:

1 Dissolve picric acid in an alcohol (ethanol, methanol or acetone).
2 Cool down with an ice bath. Keep below 10C.
3 Slowly add sodium carbonate. Mind the temperature.
4 Once everything is added and dissolved, let it react for 30 min.
5 Pour out in ice cold water. And place it in the fridge.
6 Let the sodium picrate precipitate. For a few hours.
7 Filter the sodium picrate. Wash it with cold water a few times.

Recrystallization is not needed. If you want to store it then store it slightly damp.
When you intend to use it, dry it with gentle heat.

Potassium picrate

$C_6H_2N_3KO_7$

Molar mass: 267.19g/mol
Pyro valence: +6
Melting point: 250℃
Sensitivity: High sensitivity, detonates at 331℃.

Formula:
$K_2CO_3 + 2\ C_6H_3N_3O_7 \rightarrow 2\ C_6H_2N_3KO_7$

For 100g potassium picrate:
86g Picric acid
26g Potassium carbonate

Procedure:

1 Dissolve picric acid in an alcohol (ethanol, methanol or acetone).
2 Cool down with an ice bath. Keep below 10C.
3 Slowly add potassium carbonate. Mind the temperature.
4 Once everything is added and dissolved, let it react for 30 min.
5 Pour out in ice cold water. And place it in the fridge.
6 Let the potassium picrate precipitate. For a few hours.

7 Filter the potassium picrate. Wash it with cold water a few times.

Recrystallization is not needed. If you want to store it then store it slightly damp.
When you intend to use it, dry it with gentle heat.

Lead picrate

$C_{12}H_4N_6O_{14}Pb$
(in redox Pb goes most often to Pb, and has oxidation state 0
If it went to PbO then Pb would have a pyro valence of +2.
So check with lead explosives what the end products are.
End product: Pb means Pb has pyro valence 0
End product: PbO means Pb has pyro valence +2
In this case Pb is the end product of redox.)

Molar mass: 663.4g/mol
Pyro valence: +24
Sensitivity: High sensitivity as hydrate. When dried lead picrate is incredibly sensitive and cannot be handled without explosive decomposition occurring.
DO NOT dry lead picrate. Let excess water evaporate naturally.
This is a primary

Both lead carbonate and lead oxide react with picric acid to form lead picrate.

Formula:
$PbCO_3 + C_6H_3N_3O_7 \rightarrow PbC_{12}H_4N_6O_{14}$

For 5g lead picrate:
1.73g Picric acid
2.01g $PbCO_3$
(or 1.68g PbO)

Procedure: (again both lead carbonate and lead oxide work)

1 Dissolve picric acid in an alcohol (ethanol, methanol or acetone).
2 Cool down with an ice bath. Keep below 10C.
3 Slowly add lead carbonate. Mind the temperature.
4 Once everything is added and dissolved, let it react for 30 min.
5 Pour out in ice cold water. And place it in the fridge.
6 Let the lead picrate precipitate. For a few hours.

7 Filter the lead picrate. Wash it with cold water a few times.

Recrystallization is not needed. If you want to store it then store it slightly damp.
When you intend to use it, dry it with gentle heat.

Ammonium picrate

C6H6N4O7

Molar mass: 246.135 g/mol
Pyro valence: +9
Melting point 265℃
Solubility in water: 10g/L (20℃)
Sensitivity: medium

Formula:
(NH4)2CO3 + 2 C6H3N3O7 → 2 C6H6N4O7

For 100g of ammonium picrate:
93g Picric acid
19.5g Ammonium carbonate

Procedure:

1 Dissolve picric acid in an alcohol (ethanol, methanol or acetone).
2 Cool down with an ice bath. Keep below 10C.
3 Slowly add ammonium carbonate. Mind the temperature.
4 Once everything is added and dissolved, let it react for 30 min.
5 Pour out in ice cold water. And place it in the fridge.
6 Let the ammonium picrate precipitate. For a few hours.
7 Filter the ammonium picrate. Wash it with cold water a few times.

Recrystallization is not needed. If you want to store it then store it slightly damp.
When you intend to use it, dry it with gentle heat.

Azides

The common laboratory method for preparing azides is:
Prepare excess ethanol as solvent for both reactions on an ice bath. Keep temps below 10℃.
React a nitrite ester with ethanol and sulfuric acid, generating ethyl nitrite.
2 NaNO2 (nitrite ester) + 2 C2H5OH (ethanol) + H2SO4 → 2 C2H5ONO (ethyl nitrite) + Na2SO4 (sulfate salt) + 2 H2O
You can then extract the sulfate before doing the next reaction. By filtering the solution as the sulfate salt has precipitated.
React ethyl nitrite with hydrazine and hydroxide salt (which becomes the desired end product).
C2H5ONO (ethyl nitrite) + N2H4·H2O (hydrazine) + NaOH (hydroxide) → NaN3 (desired azide) + C2H5OH (ethanol) + 3 H2O

Notes:
Using hydrazine sulfate instead of "regular" hydrazine works.
Using carbonates instead of hydroxides likely works as well.

Sodium Azide

NaN_3

Molar mass: 65.01 g/mol
Pyro valence: 0
Density: 1.846 g/cm^3
Melting point: 275℃ (violent decomposition)
Solubility in water: 38.9g/100mL (0℃)

Sodium azide is used in air bags for vehicles. So one can extract it from these.

There are three different paths for synthesis:

1 The common more industrial method is the "Wislicenus process". The idea is to freeze pure ammonia to -33℃ (the boiling point of ammonia, the reaction works faster here) or below. And then react that with sodium metal. Iron(III) nitrate can be used as catalyst)
2 Na + 2 NH3 → 2 NaNH2 + H2
This generates sodium amide.

Make sure to have excess pure liquid ammonia to be the solvent for the next reaction. (don't use a typical solvent like water or ethanol as sodium amide reacts with these).
Then add nitrous oxide gas to the sodium amide solution. This will generate sodium azide.
$2\ NaNH_2 + N_2O \rightarrow NaN_3 + NaOH + NH_3$

2 Alternatively you add sodium nitrate to the sodium amide in cold pure liquid ammonia.
$3\ NaNH_2 + NaNO_3 \rightarrow NaN_3 + 3\ NaOH + NH_3$

[Both of these are obviously hard to perform in a homemade operation or even in a real lab setting. But if for example you are a university student with access to liquid nitrogen (basically a method to cool pure ammonia to liquid form then these routes could in theory be performed. But this is just a mention to those who can and know what they are doing.
These methods do have the great advantage of using cheap and easily obtained chemicals.
Sodium metal, ammonia, and sodium nitrate can be prepared or bought easily.
Along with nitrous oxide which can be prepared by heating and decomposing ammonium nitrate.

The third route is the laboratory method, that I will describe in more detail:]

3 This is also a two stage process, firstly:
Sodium nitrite, ethanol and sulfuric acid mixture to generate ethyl nitrite.
$2\ NaNO_2 + 2\ C_2H_5OH + H_2SO_4 \rightarrow 2\ C_2H_5ONO + Na_2SO_4 + 2\ H_2O$
Then you filter off the sodium sulfate that has precipitated.
Second stage reacting ethyl nitrite, hydrazine and sodium hydroxide for sodium azide.
$C_2H_5ONO + N_2H_4 \cdot H_2O + NaOH \rightarrow NaN_3 + C_2H_5OH + 3\ H_2O$

Notice: I will give the full procedure using hydrazine sulfate instead, which has the same molar ratio.
If you use sodium carbonate instead of sodium hydroxide then notice the molar ratio is halved.

Modified Curtius and Thiele Method:

$2\ NaNO_2 + 2\ C_2H_5OH + H_2SO_4 \rightarrow 2\ C_2H_5ONO + Na_2SO_4 + 2\ H_2O$
$2\ C_2H_5ONO + 2\ (N_2H_5)(HSO_4) + 2\ NaOH \rightarrow 2\ NaN_3 + 2\ C_2H_5OH + 6\ H_2O$

For 100g sodium azide:
106.13g Sodium nitrite
75.43g or 41mLSulfuric acid (100% conc)
150g or 150mL water
71g or 90mL Ethanol (100% conc)
(or 240mL Ethanol 37.5% conc)

5kg or 5l water
200.17g Hydrazine sulfate
61.52g Sodium hydroxide

(or 81.6g sodium carbonate, instead of sodium hydroxide).

This would be stoichiometric weights and using water as main solvent. I highly recommend testing using excesses of different kinds, maybe excess sulfuric acid to help dissolve in the second reaction.
This should in theory work, the only problem is that it will take a long time.
Very much adding in small portions.
Adding a small portion, letting it react, adding more, letting it react.
Over and over again.
To help dissolve it you can always add a little more water or heat it gently.
Once the reaction is complete the idea is to boil off most of the water.
Until it is like 50mL left. So yes you boil off 5950mL of water. And then cool the remaining water. To help precipitate the sodium azide.

I would recommend trying this on a small scale with the same ratios, and experimenting how you can manipulate the ratios to see how it affects dissolvability and yield.

So before attempting this on a large scale: Do it on a small scale and see how much water or whatever solvent do you need, and what excesses can help yield.

Procedure:

Stage 1:
1a First prepare the ethanol and water solution on an ice bath. Keep below 10C. Automatic stirring.
2a Slowly add sulfuric acid. Make sure you let it cool to 10C before going to the next step.
3a Slowly add sodium nitrite. Add in small portions at a time if needed.
4a Once everything is added, place this in a fridge with a temperature below 10C.
As the sodium sulfate is precipitating, move on to intermediate steps before stage 2:

Intermediate:
1b Prepare a 5l water vessel and add the hydrazine sulfate to it.
2b Begin cooling this vessel below 10C. And once cooled:
3b Add the sodium hydroxide.
4 Let it cool again.

Stage 2:
At this point you have a cooled 5l-hydrazine sulfate-sodium hydroxide-solution, and a cooled ethyl nitrite solution where the sodium sulfate has stopped precipitating out.
1c Prepare a filter station, where the collecting beaker is the 5l solution.
2c Pour the ethyl nitrite solution through the filter, and collect the sodium sulfate in the filter.
The final liquid mixture doesn't need cooling but should have heavy automatic stirring.
3c Let the mixture react until all solids have dissolved.
Giving gentle heat and applying more solvent are options to help the reaction.

Let this sit for 24 hours. Or pour small portions at a time over a period of a day.

Extraction:
1d Heat the solution to a boil and boil off almost all the water. (or all the water)
2d Cool the remaining damp sodium azide in a fridge, let it precipitate fully for a few hours.
3d Filter and collect the sodium azide.
4d Dry it with gentle heat.

Potassium Azide

KN_3

Molar mass: 81.12 g/mol
Pyro valence: 0
Melting point: 350℃
Solubility in water: 41g/100mL (0℃), 50.8g/100mL (20℃)

Generally has two method:

1 Mixing sodium azide and potassium carbonate powder, and then dropping hydrochloric acid solution on it.
2 Preparing hydrazine sulfate in dilute sulfuric acid, and then adding sodium nitrite and potassium carbonate mix.

Method 1, azide-hydrochloric acid route:

Formula:
$2\ NaN3 + K2CO3 + 2\ HCl \rightarrow 2\ KN3 + 2\ NaCl + H2O + CO2$

For 100g potassium azide:
80.15g Sodium azide
85.24g Potassium carbonate
150g or 130mL Hydrochloric acid (30% conc)

Procedure:
1 Prepare sodium azide and potassium carbonate as powders, and then mix them in a plastic bag, shake and mix the bag until the powders are finely mixed.
2 Prepare hydrochloric acid on an ice bath. Keep below 10C. Stir.
3 Slowly add the powder mixture.

4 Once all is added, let the mixture cool and precipitate. Then filter it.

Method 2, hydrazine-sulfuric acid-nitrite route:

Formula:
$2\ (N_2H_5)(HSO_4) + 2\ H_2SO_4 + 2\ NaNO_2 + K_2CO_3 \rightarrow 2\ KN_3 + 2\ NaSO_4 + 5\ H_2O + CO_2$

For 100g potassium azide:
85g Sodium nitrite
85.24g Potassium carbonate
403g or 330mL Sulfuric acid (30% conc)
160.45g Hydrazine sulfate

Procedure:
1 Prepare sodium nitrite and potassium carbonate as powders, and then mix them in a plastic bag, shake and mix the bag until the powders are finely mixed.
2 Prepare sulfuric acid with hydrazine sulfate on an ice bath. Keep below 10C. Stir.
3 Slowly add the powder mixture.
4 Once all is added, let the mixture cool and precipitate. Then filter it.

Lead(II) Azide

$Pb(N_3)_2$

Molar mass: 291.2 g/mol
Pyro valence: 0
Density: 4.71 g/cm^3 Detonation velocity: 5180 m/s
Melting point: 190℃ (explodes at 350℃)
Sensitivity: High, often used in detonators to trigger secondaries.
Extra cautionary note, lead is poisonous so when operating with lead salts wear gloves.

Formula:
$Pb(NO_3)_2 + 2\ NaN_3 \rightarrow Pb(N_3)_2 + 2\ NaNO_3$
(lead(II) acetate can be used also)

For 5g lead(II) azide:
2.23g Sodium azide
5.69g Lead(II) nitrate
(or 5.59g Lead(II) acetate)

Procedure:
1 Dissolve lead nitrate in water.
2 Add sodium azide.
3 Cool the solution and let the lead azide precipitate.
4 Filter.

Silver Azide

AgN3

Molar mass 149.88 g/mol
Pyro valence: 0
Density: 4.42 g/cm^3
Melting point 250℃
Sensitivity: High, it is a primary

Formula:
AgNO3 + NaN3 → AgN3 + NaNO3

For 5g silver azide:
2.17g Sodium azide
5.67g Silver nitrate

Procedure:
1 Dissolve silver nitrate in water.
2 Add sodium azide.
3 Cool the solution and let the silver azide precipitate and filter.
(gentle heat is fine to evaporate off some water)

Ammonium Azide

NH4N3

Molar mass: 60 g/mol
Pyro valence: 0
Density: 1.35 g/cm^3
Melting point: 160℃
Boiling point: 400℃ (decomposes)
Sensitivity: low sensitivity.
Inhalation of small amounts causes headaches and palpitations.

Formula:
$NH_4NO_3 + NaN_3 \rightarrow NH_4N_3 + NaNO_3$

(This double displacement reaction should in theory be able to be carried out with most ammonium salts.)

For 100g ammonium azide:
108g Sodium azide
133g Ammonium nitrate
(or using other ammonium salts:
110g ammonium sulfate
80g ammonium carbonate
79g ammonium bicarbonate
89g ammonium chloride)

Procedure:
1 Dissolve the ammonium salt in water.
2 Add sodium azide.
3 Heat the mixture to evaporate off some water.
4 Cool it down and filter.

Peroxides

It needs to be stated that peroxides are infamous as extremely sensitive and powerful primary explosives. Probably most famous is acetone peroxide (TATP), which is nicknamed “mother of satan” because of accidental detonations it causes.
Typically these are extremely sensitive to everything, shock, friction, and heat. Dropping a hammer on these with a few centimeters of height can cause detonation.

The only exception is urea hydrogen peroxide. Urea hydrogen peroxide is very different because it is not a “true” peroxide salt, rather a combination of urea and hydrogen peroxide.
So only urea hydrogen peroxide of these “peroxide” compounds is insensitive.

All the other peroxides:
Acetone peroxide
Methyl ethyl ketone peroxide
Diacetyl peroxide
Hexamethylene triperoxide diamine

Are all extremely sensitive and needs to be handled with care.

So why even mention these at all?
These are powerful, quick and easy to make and often use common household items.

The idea is that in desperate times where you need to quickly make powerful explosives with easily found materials, then these are options.
So primarily you should learn and develop operations to make safer or better explosives. Accessing quality materials and developing efficient procedures is best in the long run.
But in fighting times, one of the quickest or easiest option is peroxides.

Notice also that peroxides are suited for "immediate" usage, meaning the same week. Saving peroxide salt for a few days can work.
But you should avoid pushing for more than a week or so as peroxide salts can decompose or grow more sensitive over time becoming even more unsafe to handle.

Hydrogen peroxide is an important component for the synthesis of most peroxides. I have a chapter for hydrogen peroxide in “Basic Chemistry” and in “Common Compounds”.
It is pretty easy to find and buy.
But I do mention in the same chapter how to prepare sodium peroxide and hydrogen peroxide.

Sodium peroxide is not really explosive or sensitive and so I don’t even mention it here. But it might be interesting to consider it for compositions anyways as it is a powerful oxidizer, pyro valence between -3 and -4.
And so one can powderize it and combine it with fuel explosives.

Acetone Peroxide (TATP)

Triacetone Triperoxide, also known as acetone peroxide or TATP.
There’s variants of acetone peroxide, the dimer (diacetone diperoxide) and trimer, the trimer is the more sensitive and powerful and often desired end product.
The procedure described will be one that favors the trimer formation.

Acetone peroxide is famous for being extremely sensitive and it is only slightly less sensitive when wet. Which is why if you intend to store the acetone peroxide (which is something you should avoid) you should store the acetone peroxide; wet, in small quantities, in plastic containers (never glass), and for short periods (a couple of days, not longer than a week).

And it should be stored in a cool and dark place away from sunlight and heat.
I also suggest not having a lid on the plastic container, maybe plastic wrap and rubber instead, to avoid accidentally causing friction on any TATP on the rims.
You can store it dry but again do small quantities, cool dark places, plastic container and no lids.
And again don't store it for long times, longer than a week, there may be decomposition and the TATP becomes more sensitive over time.

Acetone peroxide should not be pressed. It would only be ok if you have a pressing set up where you can expect an accidental detonation. Meaning even if a few grams TATP exploded there would be no damage to you or the equipment. And there's no material like glass or wood that fragments.
Having a stand-off distance and ballistic barriers is what is recommended.
And using strong thick cloth for clothes. And gloves.

It should not be melt cast either. If one would want to attempt it one needs the same safety measures as for pressing; thick protective clothing and gloves, stand-off distance, and ballistic barrier.
But you can also avoid overheating and detonation by using a hot water bath instead of regular heating. Meaning you place the TATP in a plastic bowl, and place that bowl in water, and heat the water to the boiling point of the primer 91C.
If it doesn't melt, you know you only synthesize the weaker dimer.

C9H1806

Molar mass: 222.24 g/mol
Pyro valence: +42
Melting point: 131°C (dimer), 91°C (trimer)
Density: 1.18 Detonation velocity: 5690 m/s RE Factor: 0.8
Sensitivity: Very high, dropping a hammer 2.7cm above and on TATP can cause detonation. Explodes immediately in contact with flame.

Formula:
3 C_3H_6O + 3 H_2O_2 (+ acid catalyst) → $C_9H_{18}O_6$
Molar ratio 1:1:0.25 : ⅓ or 3:3:0.75:1

Note that the best acid catalyst to use is hydrochloric acid, rather than sulfuric acid. Sulfuric acid works but causes more dimer formation, and the end product is less stable. The main explanation for accidental detonations are sulfuric acid traces tapped inside the crystals causing instability.
Therefore it is highly recommended to use hydrochloric acid.

For 5g TATP:
3.92g or 5mL Acetone
7.65g or 6.90mL Hydrogen peroxide (30% conc)
2.05g or 1.78mL Hydrochloric acid (30% conc)

Procedure:
1 Prepare hydrogen peroxide and hydrochloric acid in a beaker.
2 Place in an ice bath and stir. Keep below 10C.
3 Slowly add acetone. Once all is added and stirred, move on to the next step.
4 Place the solution in a fridge below 10C and leave it for an hour to precipitate.
If you make larger batches, then leave it overnight.
If you can maintain automatic stirring do so.
To control the smell you can place plastic wrap with a rubber band on the beaker.
5 Filter and wash the TATP in the filter with cold water a few times.

Methyl Ethyl Ketone Peroxide (MEKP)

Explosive liquid and peroxide. So it is very sensitive but also very powerful.
Methyl ethyl ketone is found and can be purchased as glue.

Molar mass: 210.226 g/mol
Pyro valence: +38
Density: 1.170 g/cm^3 Detonation velocity: 5200 m/s RE factor: 0.9
Decomposes above 80°C.
Sensitivity: high.

Formula:
2 C4H8O (methyl ethyl ketone) + 2 H2O2 (+ acidic catalyst) → C8H18O6
Molar: 1:1:0.25:½ or 2:2:0.5:1
Hydrochloric acid is likely the best choice here.

For 5g MEKP:
3.43g or 4.25mL Methyl ethyl ketone
5.39g or 4.86mL Hydrogen peroxide (30% conc)
1.44g or 1.25mL Hydrochloric acid (30% conc)

Procedure:
1 Ice bath a mixture of hydrogen peroxide with hydrochloric acid. Keep below 10C.
2 Once cooled slowly add the mek.
3 Place in the fridge and let the MEKP precipitate.
For a few hours with small amounts. Overnight or 24h with larger amounts.
4 To filter this use a separatory funnel. (as MEKP is a liquid.)
(MEKP has slightly higher density, and is unclear how soluble in water.

And so I recommend placing the solution in the separatory funnel for the cooled precipitation in the fridge.
And the MEKP should be the smaller amount of colorless oily liquid gathering at the bottom.)
(Again at step 3 you can place the liquid in the separatory funnel, and then in the fridge, to precipitate, and then filter the bottom liquid.)

Diacetyl Peroxide

C4H6O4

Molar mass: 118.088 g/mol
Pyro valence: +14
Density: 1.163 g/cm^3
Melting point: 30°C
Boiling point: 121°C
Slight solubility in cold water.
Flash point 32.2°C.
Sensitivity: Very high, moderate when wet. 25% solutions in water can also explode. So for maximum storage safety having lower than 25% conc solution is more than sufficient.
And concentrating is easily achieved by cooling to 0°C and filtering the solid.

Overall formula:
C4H6O3 (acetic anhydride) + H2O2 → C4H6O4 + H2O
(This is the overall reaction excluding the intermediate steps that causes a need for excess acetic anhydride.)

Basically one can either do this stoichiometric reaction first, causing the intermediate peracitic acid. Adding excess acetic anhydride to generate the peroxide salt.
Or what I recommend is preparing all the acetic acid (excess also) cooled and then adding small amounts of hydrogen peroxide. So the acetic anhydride is always in heavy excess for the reaction.

I suspect having a large excess of molar ratio around 2, meaning double the amount of acetic anhydride is feasible.
Though of course I recommend experimenting on a small scale what excess ratio is needed or has the greatest yield. Remember at some point the extra acetic anhydride doesn't help increase the yield any more.

For 5g diacetyl peroxide:
8.64g or 8mL Acetic anhydride
4.80g or 4.32mL Hydrogen peroxide (30% conc)

Procedure:
1 Prepare the acetic anhydride on an ice bath. Below 10C.
2 Slowly add hydrogen peroxide in small portions.
3 Once added, place the solution in the fridge.
For small batches let it sit a few fours.
For large batches let it sit overnight or 24h.
4 Filter the precipitated salt and wash it with ice cold water a few times.
5 Collect and store in a cold dark place, below 32.2C (the flash point) to avoid volatile fumes building up.
Alternatively storing it in a water solution in a cold dark place, to decrease the sensitivity.
An option is for example to store it in the fridge in cold water, and just filter when it's time to use.

Hexamethylene Triperoxide Diamine (HMTD)

$C_6H_{12}N_2O_6$

Molar mass: 208.17 g/mol
Density: 0.4 g/cm^3 Detonation velocity: 2800 m/s
Density: 1.1 g/cm^3 Detonation velocity: 5100 m/s RE factor: 0.74
Decomposes at 75°C
Sensitivity: High, ignites spontaneously at 133°C. Slightly more sensitive than fresh TATP.

Formula:
$C_6H_{12}N_4$ (hexamine) + 3 H_2O_2 + (acid catalyst)→ $C_6H_{12}N_2O_6$ + 2 NH_3
Generally it was shown that citric acid has the best yield. And hydrogen peroxide needs to be at least 12% concentration, and greater is better for yield.

For 5g HMTD:
3.37g Hexamine
8.17g or 7.36mL Hydrogen peroxide (30% conc)
2.31g Citric acid

Procedure:
1 Prepare hydrogen peroxide and citric acid solution on an ice bath, below 10C.
2 Slowly add the hexamine.
3 Place in the fridge and let the HMTD precipitate. Let it sit for many hours.
4 Filter and collect.

Urea Hydrogen Peroxide

$CH_6N_2O_3$

Molar mass: 94.070 g/mol
Pyro valence: +4
Density: 0.85 g/cm^3 Detonation velocity: 3650 m/s RE factor: 0.4-0.57
Density: 1.1 g/cm^3 Detonation velocity: 3860 m/s
Melting point: 75-91℃ (decomposes)
Sensitivity: Insensitive. (unlike other compounds with peroxide in the name).

Formula:
$CO(NH_2)_2$ (urea) + H_2O_2 → $[CO(NH_2)_2][H_2O_2]$
To help the reaction hydrogen peroxide is used in excess. Molar ratios being 2:3:2, respectively.
Meaning: 1 mol urea : 1.5 mol hydrogen peroxide : 1 mol urea hydrogen peroxide
Further 30% concentration hydrogen peroxide should be used.
And the reaction boosted by gentle heat (around 60℃)

For 100g urea hydrogen peroxide:
63.87g Urea
180.73g or 162.34mL Hydrogen peroxide (30% conc)

Procedure:
1 Add urea to hydrogen peroxide solution.
2 Stir while heating the solution to 60℃.
3 Hold the temperature for 30 min or more.
4 Place the solution in a fridge and cool it close to 0℃.
5 Filter and collect the precipitated salt.
You can do the last drying on a crystallization dish.

Author's note:
I've considered the possibility of preparing urea hydrogen peroxide from urea and sodium carbonate alone.
The advantage being that urea and sodium carbonate are so readily available. Urea can even be extracted/prepared yourself.
And large purchases of concentrated (10-30%) hydrogen peroxide might either be flagged or restricted to begin with.

The basic idea is to thermally decompose sodium carbonate into sodium oxide. Before increasing the heat and applying/blowing oxygen to oxidize it into sodium peroxide. (This process is described in the chapter "hydrogen peroxide" in "common compounds".

Sodium peroxide reacts with water to produce sodium hydroxide and hydrogen peroxide.
Meaning in theory you could decompose a lot of sodium carbonate into sodium peroxide and reach with water for high concentrations of hydrogen peroxide solutions (that default or revert back to 30%).

And then you simply add urea to the solution, and use heat to facilitate the reaction, cool it, and filter the precipitate.

There's a concern though, and that is that the sodium hydroxide present in the solution might counteract the reaction, but if it doesn't then it should just stay dissolved in the water due to its high solubility, and if anything maybe help the precipitation of the urea hydrogen peroxide.

Tetrazoles

5-aminotetrazole

CH3N5

Molar mass: 85.070 g/mol
Pyro valence: +7
Density: 1.806 g/cm^3 Detonation velocity: 8610 m/s
Melting point: 200-205℃
Sensitivity: Almost insensitive. Meaning it still can detonate to large shock or friction.

Tetrazoles are generally very good explosives. These are very strong and often not very sensitive. The only problem is that they are complicated and very time consuming to prepare, meaning it's a very demanding synthesis process.
There are many pathways and each pathway has many steps.
Now luckily for me a very detailed explanation for 5-aminotetrazole was posted online in science madness.
It is called: "Synthetic routes to tetrazole compounds based on OTC materials" by Engager.

I have saved the post/document itself in appendix 5 and can be read there. I have also posted links in appendix 5 for the original post, and pdf links.

Here's a youtube video following the procedure:[75]

"Making Tetrazoles ❙ One of the Most Nitrogen Containing Compounds", Savinja Labs, 17 Jun 2025, https://www.youtube.com/watch?v=YpqeFap2s90

So for full procedural information for all possible pathways go to appendix 5 and/or follow the above mentioned video.

Nitramines

Ethylenedinitramine (EDNA)

Also called Haleite or Explosive H.

$C_2H_6N_4O_4$

Molar mass: 150.094 g/mol
Pyro valence: +2
Density: 1.71 g/cm^3 Detonation velocity: 7570 m/s
Melting point: 177℃
Solubility in water: 0.10 g/100 ml (10 °C), 5.00 g/100 ml (75 °C)
Sensitivity: medium to high, thermally unstable above 170-180°C, melts at 176°C with decomposition

Molar ratio:
Ethylene urea : Nitric acid → EDNA
1 : 6.53 : 1

For 100g EDNA: (theoretically)
57.4g Ethyleneurea
274g or 182mL Nitric acid (100% conc)

Procedure:[76] (this procedure has an expected yield of 55%)
1 Around-bottom flask was equipped with a stir bar and 90% nitric acid (fuming nitric acid) and cooled to 0C.
2 To this ethyleneurea was added portion-wise while keeping the temperature below 20C.

[75] "Making Tetrazoles ❙ One of the Most Nitrogen Containing Compounds", Savinja Labs, 17 Jun 2025, https://www.youtube.com/watch?v=YpqeFap2s90
[76] Aakeröy, Christer B.; Wijethunga, Tharanga K.; Desper, John . (2015). Crystal Engineering of Energetic Materials: Co-crystals of Ethylenedinitramine (EDNA) with Modified Performance and Improved Chemical Stability. Chemistry - A European Journal, 21(31), 11029-11037. doi:10.1002/chem.201501721

3 The reaction mixture was stirred under these conditions for 1h, subsequently allowed to warm to room temperature.
4 The reaction mixture was then quenched with iced water and the precipitate that formed was collected by filtration.
5 The precipitate was added to about 50 mL of boiling water in small portions and the temperature of water was maintained until no more gas evolution was seen. Then the aqueous solution was cooled in an ice bath and the precipitated desired product was collected by filtration as a white crystalline powder in 55% yield.

Tetryl

C7H5N5O8

Molar mass: 287.144 g/mol
Pyro valence: +17
Density: 1.71 g/cm^3 Detonation velocity: 7770 m/s RE factor: 1.25
Melting point: 129.5℃
Boiling point: 187℃ (decomposes)
Sensitivity: medium sensitivity.

The production of tetryl is two step:
1 Pass aniline and methanol vapor over aluminium oxide catalyst at 300-400℃ to produce dimethylaniline.
The catalyst needed aluminium oxide can be a powder or wire. Aluminium oxide (sometimes called alumina) is easily purchased.
2 Dimethylaniline is nitrated with concentrated nitric acid and sulfuric acid in an ice bath.
This produces tetryl, which is insoluble in water and soluble in acetone.
Meaning you extract it by crashing it out in water, and you can recrystallize it in acetone.

Dimethylaniline synthesis:

Stoichiometrically the reaction is 1:1. But in practice you want at least the molar ratio 1:5, aniline:methanol.
Meaning you use at least 5 times or more moles methanol per aniline.
This corresponds to weight ratios of:
1g : 1.72g
Aniline : Methanol

This corresponds to volume ratios of:

1mL : 2.22mL
Aniline : Methanol

These are mixed in a distillation set up. With aluminium oxide wire or powder in the glass tube the vapor passes through.
Place a bunsen burner beneath the aluminium oxide part of the glass tube and heat it to 300-400℃.
Then heat the liquid mixture to 200℃ (aniline boils at 184.13℃ and methanol at 64.7℃). The large excess of methanol is needed because it starts boiling away a lot earlier than the aniline.
When all the liquid mixture has been evaporated you are left with a distillate of methanol and dimethylaniline.
Extracting the dimethylaniline has two options:
1 Place this in a fridge and cool it to 0℃ (dimethylaniline solidifies at 2℃). Then filter it out of the methanol that can be reused.
2 Distill off the methanol (the boiling point of dimethylaniline is 194℃). So heat the product to 65℃ and boil off the methanol which can be reused for the next batch.

Tetryl synthesis:

Molar ratios:
1 : 4 : 4 : 1
Dimethylaniline : Sulfuric acid : Nitric acid → Tetryl

For 100g tetryl:
42.2g or 43.06mL Dimethylaniline
136.6g or 74.2mL Sulfuric acid (100% conc)
87.75g or 58.1mL Nitric acid (100% conc)

Procedure:[77]
1 Prepare sulfuric acid on an ice bath. Keep close to 0℃.
2 Slowly add dimethylaniline. Once all is dissolved, keep it stirring and cooled for 30 min.
3 Slowly add nitric acid in small portions over some time.
4 Once all is added let it react for 30 min.
5 Pour out in large amounts of water. This will precipitate the tetryl.
6 Filter and wash the crude tetryl with water a few times..
7 Perform a recrystallization of tetryl in acetone. By dissolving the tetryl in the acetone and then either: evaporate off the acetone or pour out in water. Until the tetryl precipitates again and then filter. And again wash with water.

[77] "LASL explosive property data", Gibbs and Co, 1980, p 163-164, https://archive.org/details/LASL_Explosive_Property_Data/mode/2up

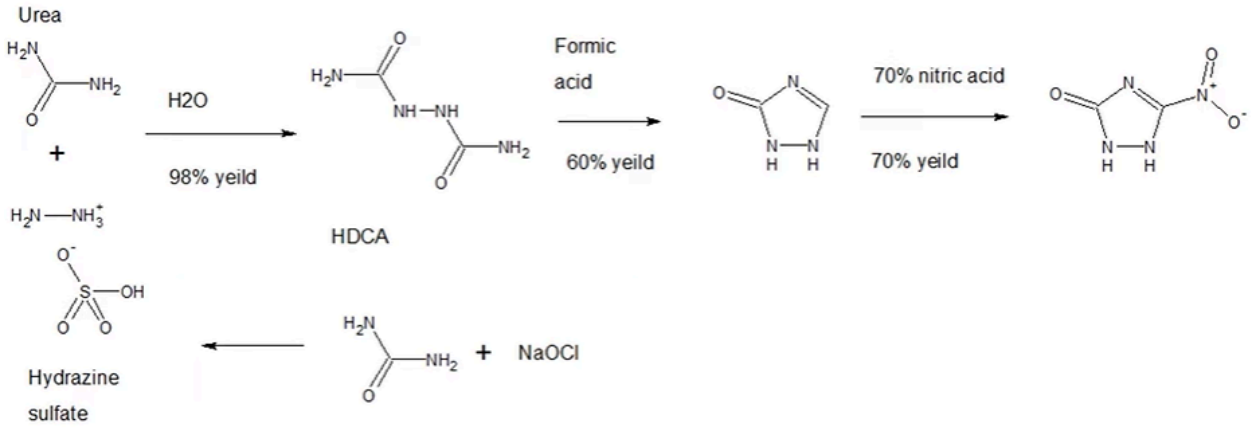
Nitrotriazolone (NTO)

C2HN4O3

Molar mass: 130.063 g/mol
Pyro valence: +3
Density: 1.87 g/cm^3 Detonation velocity: 8120 m/s RE factor: 1.60
Density: 1.9 g/cm^3 Detonation velocity: 8500 m/s
Melting point: 268-271℃
Solubility in water: 17.2g/L
Sensitivity: Very low sensitivity. Very stable. Burns when heated with a flame.

NTO is a weak acid and can even form salts, one of which is the combination to hydrazine. But NTO is by itself a powerful explosive.

Formulas:



The procedure describes starting with the synthesis of HDCA (hydrazodicarbonamide). Meaning the reaction between urea and hydrazine sulfate. This means it will describe a three stage process. HDCA synthesis, 1,2,4-triazol-3-one synthesis, and NTO synthesis.

But as you can see in the formula chart is that hydrazine sulfate can be generated using urea and sodium hypochlorite (bleach), which is described in the “hydrazine sulfate” chapter.

For 100g NTO (theoretically):
228.6g Hydrazine sulfate
105.5g Urea

[Expected HDCA: 91.3g (with 88%) yield.]
[Formic acid is recommended to be used in large excess to the HDCA. So not the stoichiometric molar ratios 1:1.
But either 1:5 or 1:10, for HDCA:formic acid.
This gives corresponding weight ratios of:]

2.64g-5.29g Formic acid (100% conc) per g of HDCA
[Somewhere around 240.8g to 482.8g pure formic acid is expected to be used. So multiply the g HDCA you extracted with the weight ratio and then divide by the concentration formic acid you use.]
[Expected 1,2,4-triazol-3-one: 62.4g (with 70%) yield]

1.16g-1.27g Nitric acid (70% conc) per g of 1,2,4-triazol-3-one
[Somewhere around 73-79g 70% nitric acid is expected to be used. So multiply the g 1,2,4-triazol-3-one with the weight ratio. If you want to adjust for a different concentration, take the answer *0.7 and then /(new conc)]

In theory this should yield 95.4g of NTO. But the final step has an expected yield around 70%. Meaning you likely produce somewhere around 66.8g NTO.
But depending on concentration and method you can drive the yield up.

Procedure:[78] (by NinjaChemist) (has a yield of ca 70%)

Stage 1:
Mix urea and hydrazine sulfate in water and boil it for 5 hours. Use a condenser to allow the water back into the mixture. This will have a yield of ca 88%.

(But if you want to get close to 98% yield, you need to slowly drip sulfuric acid into the mixture and hold the pH between 2 and 3.
It is very important if you add sulfuric acid to not add too much, a pH below 2 means the HDCA will decompose and revert back to urea and hydrazine sulfate.)

The HDCA will precipitate and can be filtered off.

Stage 2:
Add the HDCA to a large excess of formic acid. Higher concentration formic acid is better >80% works.

[78] "Insensitive explosive from urea. NTO, nitrotriazolone", NinjaChemist, 2 Aug 2025, https://www.youtube.com/watch?v=fHBqgnZDffY

Lower concentrations might increase reaction time a lot, if they even work.
Then boil this mixture for 12 hours. (Formic acid boils around 100℃)
Again use a condenser to condense the formic acid back in the reaction.

To extract the 1,2,4-triazol-3-one, you now change the condenser for a distillation set up, and boil off the formic acid. Distilling over the formic acid.

Filter the remaining product and wash it with water.

Let it fully dry before moving to the last stage.

The yield is around 63% using the lower concentration like in the youtube video.

Stage 3:
Add the 1,2,4-triazol-3-one to nitric acid. The higher the concentration of nitric acid the better, but >60% works. More dilute will have very long reactions time if they work at all.

Once added, heat to 65-75℃ and hold the temperature for 2 hours.

Notice this reaction produces dangerous fumes so do it outside or in a well ventilated area, where you can avoid breathing the fumes in.

The good thing is that an ice bath is not needed. Though it is always good to have a dump bucket close by if you somehow were to get a runaway reaction impending.
Then simply dumb off and quench the reaction in water, the NTO product you did produce will precipitate.

To extract you either cool down the mixture and filter. Or you dump it out in water which you cool down and then filter.

When the product is in the filter you wash it with cold water a few times.

TEX

Also known as in chemistry papers as:
4,10-dinitro-2,6,8,12-tetraoxa-4,10-diazatetracyclo[5.5.0.05,9.03,11]-dodecane

C6H6N4O8

Molar mass: 262.134 g/mol

Pyro valence: +14
Density: 1.985 g/cm^3 Detonation velocity: 8500 m/s RE factor: 1.70
Autoignition temperature: 252℃
Solubility in water: insoluble.
Sensitivity: Low sensitivity. Very stable.

Unlike many other explosives which are common and thus have internet synthesis videos, TEX is quite new and the exact reaction steps are not settled.
I prefer to cite videos primarily because I can concise the relevant information in them for a reader and the video can serve as visual aid.

When citing papers usually there's a lot more effort to try and concise their often massive blocks of text, filled with unintelligible code language.
But I did find a paper with pretty straightforward synthesis procedures.

The main source of information I use for TEX is the following paper:[79]
Maksimowski, P., & Gołofit, T. (2012).
4,10-Dinitro-2,6,8,12-tetraoxa-4,10-diazatetracyclo[5.5.0.05,903,11]dodecane Synthesis. Journal of Energetic Materials, 31(3), 224-237. https://doi.org/10.1080/07370652.2012.716490
Sci-hub link: https://www.pismin.com/10.1080/07370652.2012.716490

The synthesis of TEX basically involves two stages:
Stage 1: 1,4-diformyl-2,3,5,6-tetrahydroxypiperazine (DFTHP) synthesis
Stage 2: Converting DFTHP into TEX.

Stage 2 has different variants but a regular method is normal nitration with certain particularities, like acid scavengers. Which is the one I will cite.

Stage 1; DFTHP Synthesis

"DFTHP is produced in the base-catalyzed condensation of aqueous glyoxal and formamide. A typical condensation is carried out by dissolving formamide in 40% w=w aqueous glyoxal in a molar ratio of 1:1 or 1:2, cooling to 0C, and addition a base (NaHCO3 or NaOH), to achieve a pH of 8–10. The first synthesis of DFTHP [8–11] is often characterized by extremely long reaction times of 25–72h. The yields in this reaction step of these syntheses vary widely, from 28 to 81%.

[79] Maksimowski, P., & Gołofit, T. (2012).
4,10-Dinitro-2,6,8,12-tetraoxa-4,10-diazatetracyclo[5.5.0.05,903,11]dodecane Synthesis. Journal of Energetic Materials, 31(3), 224-237. https://doi.org/10.1080/07370652.2012.716490
Sci-hub link: https://www.pismin.com/10.1080/07370652.2012.716490

Gottlieb et al.'s [2] patent discloses a method of producing DFTHP in which the base (NaOH) was added to the glyoxal prior to introducing the formamide, such that the formamide contacts a homogeneous, basic solution. The pH of the reaction mixture was maintained above 10, which accelerated the rate of DFTHP production and enhances selectivity. The temperature was controlled between 30–45C. The method provided a yield of 80–85%, typically within 1h."

Basically use a high amount of sodium hydroxide to hold a pH above 10, hold the temp around 30-45C. And react formamide (40% conc) with a glyoxal solution in the above mentioned conditions, molar ratio 1:1 or 1:2 respectively, for 1 hour.
So 1 hour reaction time total.

For 100g DFTHP (theoretically):
54.6g or 51mL Formamide (40% conc)
28.16g Glyoxal (using 1:1 molar ratio)
(Or 56.32g Glyoxal (using 1:2 molar ratio))

For 100g DFTHP (practical yield, assuming 80% yield):
68.25g or 68.3mL Formamide (40% conc)
35.20g Glyoxal (using 1:1 molar ratio)
(Or 70.40g Glyoxal (using 1:2 molar ratio))

As for sodium hydroxide I suggest getting a digital tool for measuring pH and just add until you reach above pH 10. And of course measure during the synthesis to see if more needs to be added.

Stage 2; TEX by nitration Synthesis

"The TEX synthesis setup comprised a 10-dm3 reaction vessel equipped with a mechanical stirrer, a reflux condenser, a thermocouple for measurement of the temperature of the reaction mixture, and a nitrogen-feeding tube. Into the reaction vessel, 1,000cm3 (23.57mol) 99% nitric acid and 750cm3 (13.52mol) 96% sulfuric acid were introduced. The solution was heated to 54C and a mixture of thoroughly ground mixture of 357g (1.73mol) DFTHP and 55g (0.92mol) of urea was added in about 15-g portions. The reaction was conducted over a temperature range of 54–56C. The temperature fluctuations were controlled by cooling intensity and the speed of the reactant addition. The reactant addition was terminated in ca. 2h. The reaction mixture was conditioned for another 2h at the same temperature followed by 30min at a temperature of ca. 8C, whereupon the precipitate formed was filtered off and washed several times with water and methanol. TEX was obtained (117g) in a 39% yield."

To purify the TEX you perform a recrystallization in acetone. Heat acetone to elevated temperatures, with a condenser you might hold a boil around 56C, otherwise do 40C.
Dissolve all the TEX and once it is all dissolved, take off the heat.

And pour the acetone solution into copious amounts of cold water. This will precipitate the TEX.
Then filter and wash the TEX in the filter a few times with cold water. And then dry it.

Compositions

Compositions are combinations of explosives that aim to achieve certain properties or benefits for different uses, but normally it tries to maximize the efficiency by balancing the oxidation states.

The balancing of oxidation states is quite easy mathematics and practise when using pyro valence. I highly suggest reading the chapter “Pyro valence” in “Basic Theory of Explosives”.
This achieves a balance of electron and oxygen exchange in the explosive, and there’s no loss of explosive power or efficiency due to lack of electron gain or loss.

Other areas of usage are for example: armor piercing, detonators and quarrying.
Armor piercing typically involves insensitive and powerful munitions that don’t detonate immediately on impact, instead digs deep into the vehicle before detonating.
Detonators use sensitive and powerful explosives that easily detonate and are powerful enough to trigger other explosives.
Quarrying explosives are usually selected for cheapness because of the large amounts used. These are also suited for razing buildings. These will be the base charges in very large explosives.

These compositions are not theoretically calculated and more often tested through trial and error. But since many are well known I suggest just using the already well known compositions.
So for example if designing a shape charge or armor piercing charge, I recommend using what is available on the internet.
And for detonators it is often sufficient using one primary explosive without balancing it.

But for most charges, booster and base charges, I recommend using pyro valence to calculate and balance the explosives, because for larger charges it makes a larger difference.
And for quarrying/building destroying bombs you just balance cheap explosives.
There are different methods to combine explosives:

1 Powder explosive and powder explosive.
The quick option using fine powder explosives is to mix them in a plastic bag by shaking it. Alternatively if the explosives are too sensitive you can use the paper folding method, placing explosives on a paper, and mix them by folding the corners back and forth and fold them onto themselves.

2 Powder and liquid explosive.
In a sense one would think these are easier to mix because the powder can be absorbed and dissolved with the liquid explosive. But the problem is that liquid explosives are usually very sensitive.
Traditionally, men like Nobel, would prepare dynamite by combining nitroglycerine with wax and nitrocellulose.
I suggest similarly to combine liquid explosives with very stable compounds that can absorb or dissolve into the liquid explosive, like candle-wax or nitrocellulose or cellulose, etc. These do stabilize the liquid explosives.
I would also encourage to not desperately strive for total oxygen balance. Because liquid explosives are already usually very powerful. Their main problem is sensitivity thus it makes more sense to mix it with wax or cotton to stabilize it.
There's two ways to do this, either adding the compounds into each other and just mixing regularly.
Or you add them together and mix by turning the vessel and "folding" the compounds onto themselves.
I'm not sure which is safest. Probably a very slowly turning vessel, allowing these to be added

3 Powder explosive and liquid:
What I mean by this is that fuel/gasoline, etc, many burnable liquids can be added to explosive powders. This makes extra sense if these are cheap and oxidizers.
Basically for large charges and base charges you want cheap oxidizers and fuel liquids (often cheap and easy accessible in bulk).
These are easily prepared like for example ANFO. ANFO is ammonium nitrate and fuel/oil. Simply dumb the insensitive ammonium nitrate out on a large water-intact blanker, and pour fuel onto it and mix thoroughly.
I would imagine similar compositions can be made using chlorates and liquid fuels.
But again use powder explosives that are insensitive, and it makes most sense to use those that are oxidizers which are balanced with the fuel.
Lastly for maximum power explosives I recommend using balanced explosives which are powerful rather than this type of composition. This type is better fitted for large charges, because they are easier to prepare in large quantities and more cheap.

4 Melt cast:
Melt casting involves melting explosives together and creating a "fused" variant. This is the ideal composition method because it creates a more finely mixed and dense product. Once resolidified you can still press it to maximize density.
This commonly was done using TNT as it's relatively safe to melt TNT.
But amateur bomb makers have done this using ETN and this explosive is extremely dangerous when molten. And only becomes reasonably safe once resolidified and cooled again.
That is to say the safety of melt casting heavily depends on the compounds you are working with.

I suggest always using stand-off operations, using a safe distance with ballistic protection, where you can operate the heat at a distance, and if anything were to go wrong and detonate there would be no damage to you or essential equipment.

I also recommend trying these on a small scale before increasing the size of the operations.

To help figure out which explosives can be melt cast you need to find those which have low melt points and don't decompose upon melting.
And always be careful and remember that explosives generally become more sensitive when melted.

I will categorize the compositions in categories based on the main charge. And the compositions will be displayed as the percentages of each component by weight.
Example:
Ammonium nitrate/Fuel Oil
94.5/5.5

And you use this for example by either saying: 100kg bomb would then require (100*0.945, 100*0.055) 94.5kg ammonium nitrate and 5.5kg fuel oil.
Or by saying I have 94.5kg ammonium nitrate I need (94.5 /94.5 * 5.5) 5.5kg fuel oil.

Ammonium Nitrate

Ammonium nitrate pyro valence: -2
These compositions are oxygen balanced:

Ammonium Nitrate/Fuel Oil (ANFO)

94.5 / 5.5

Ammonium Nitrate/Urea Nitrate (ANUN)
24.5 / 75.5

Ammonium Nitrate/NitroMethane (ANNM)
66.3 / 33.7

Ammonium Nitrate/Sugar (ANSU)
84.2 / 15.8

Ammonium Nitrate/Aluminium (Ammonal)
81.7 / 18.3

Ammonium Nitrate/Methyl Ammonium Nitrate (Tovex)
63.0/37.0

RDX

RDX
Pyro valence for RDX: 0 (already balanced, meaning good efficiency)
These compositions are not necessarily oxygen balanced, but instead common preparations for different properties.
Composition A. Composition A uses a small amount of wax to desensitize it and to help pack the RDX. The variants are:
Composition A3: 91% RDX, 9% wax.
Composition A5: 98.5-99.1% RDX, 0.95-1.54% stearic acid.

Composition B. Composition B is a melt cast explosive of TNT and RDX (sometimes with small amounts of was). The variants are:
Composition B (proper): 59.5% RDX, 39.5% TNT, 1% paraffin wax.
Composition B4: 60% RDX, 39.5% TNT, 0.5% calcium silicate.

Composition C. Composition C uses plasticizers that act as a carrier and desensitizer for the RDX. This composition can be shaped for different shaped charges and can be shot out of rifles without detonating. The variants are:
Composition C-1: 88.3% RDX, 11.7% non-oily, non explosive plasticizer.
Composition C-2: 80% RDX, 20% plasticizer.
Composition C-3: 77-85% RDX, 15-23% gel made out of liquid nitro compounds (e.g. liquid DNT and small amounts of MNT) and nitrocellulose or butyl phthalate and nitrocellulose.
Composition C-4: 91% RDX, 9% nonexplosive plasticizers. (often referred to as C-4, most commonly used, and what is most often meant by composition C proper.)

DBX. DBX stands for “Depth Bomb Explosive”, this was developed for underwater munitions and as a substitute for Torpex. It is a castable mixture consisting of:
21% RDX, 21% ammonium nitrate, 40% TNT, 18% pondered aluminium.

Cyclotol. Cyclotol is a castable mixture similar to composition B, but with different ratios, consisting of:
50-80% RDX, 20-50% TNT, most commonly 70/30, RDX and TNT respectively.

Torpex: designed during World War II and used mainly in underwater ordnance, consists of:
42% RDX, 40% TNT, 18% powdered aluminium.

TNT

TNT
Pyro valence of TNT: +21 (fuel)
Only the amatol is an oxygen balanced composition.

Amatol (ammonium nitrate/TNT)
78.7/21.3 (oxygen balanced)
(Normally commercially they do 80/20, but above is closer to the stoichiometric.)

Ednatol
55% ethylenedinitramine and 45% TNT
It has a detonation velocity of approximately 7,400 metres per second. It is a uniform blend with a melting point of 80 °C.
Ednatol was cast in the same manner as amatol. The resulting explosive was stable, non-hygroscopic and could be stored for long periods.

Composition H6

45.1 ± 0.3% RDX
29.2 ± 3.0% TNT
21.0 ± 3.0% powdered aluminium
4.7 ± 1.0% paraffin wax as a phlegmatizing agent
0.47 ± 0.1% calcium chloride as a desiccant to prevent moisture from reacting with the powdered aluminium.
where it has generally replaced torpex, being less shock-sensitive and having more stable storage characteristics. It is approximately 1.35 times more powerful than pure TNT.

Minol

40% TNT
36% ammonium nitrate
4% potassium nitrate
20% powdered aluminium
The addition of potassium nitrate minimized expansion of Minol, making it more stable to temperature changes than TNT, but didn't solve the expansion problem. Minol IV could still expand and develop cracks after prolonged thermal cycling. A new composition, with 20% of potassium nitrate in solid solution, was developed. It didn't expand or crack even when cycled for months, but wasn't adopted for production and service.

Octol

75% HMX & 25% TNT
The advantage of Octol is that it significantly reduces the size and weight of the explosive charge required.

Pentolite

50% PETN and 50% TNT
is a composite high explosive used for military and civilian purposes, e.g., warheads and booster charges. It is made of pentaerythritol tetranitrate (PETN) phlegmatized with trinitrotoluene (TNT) by melt casting.

Picratol

52% Explosive D and 48% TNT
Two basic advantages of Picratol is its insensitivity to shock and ability to be loaded into ammunition by pouring a melted sludge.

Tritonal

80% TNT and 20% aluminium powder
The aluminium increases the total heat output and hence impulse of the TNT - the length of time during which the blast wave is positive. Tritonal is approximately 18% more powerful than TNT alone.

Tetrytol

75 / 25
Tetryl and TNT

Tetrytol is more sensitive than TNT and less sensitive than tetryl to impact.[1] The detonation velocity of unconfined cast cylindrical charges (1 inch diameter) of tetrytol is between 7290 and 7410 m/s with an average of 7350 m/s for tetrytol 75/25 and 7340 m/s for tetrytol 65/35.[2] For comparison, cylindrical charges of cast pure TNT of similar dimensions are reported to detonate with a velocity of between 6680 and 6990 m/s.

ETN

For ETN I suggest watching dugan's videos on ETN covering his method of melt casting and these different compositions.
These are at reference: 40 and 41.

Pyro valence for ETN: -2 (oxidizer)
All these are oxygen balanced.

ETN/PETN
65.65 / 34.35

ETN/RDX

64.23 / 35.77

ETN/NQ (nitroguanidine)
85.24 / 14.76

ETN/ANQ (aminonitroguanidine)
86.38 / 13.62

ETN/TNT
93.31 / 6.69

ETN/Al (aluminium)
94.38 / 5.62

ETN/TiH2 (titanium hydride)
94.78 / 5.22

ETN/NC (nitrocellulose)
94.34 / 5.65

ETN/CHAR (charcoal)
97.84 / 2.16

ETN/PG (propylene glycol)
96.95 / 3.05

Nitroglycerine

Pyrotol

60% smokeless powder, 34% sodium nitrate, and 6% of 40% nitroglycerin dynamite
Basically prepare wax or nitrocellulose stabilized nitroglycerine, make a 40% concentration, and have it be 6% by weight of this composition.

Gelignite

51% Nitroglycerine, 2% Guncotton, 37% Sodium nitrate, 10% Wood pulp
An explosive material consisting of nitrocellulose/guncotton dissolved in nitroglycerine and mixed with wood pulp and saltpetre (sodium nitrate or potassium nitrate).

Bomb Management

A short few notes before going into possible devices.

The goal of bomb testing is to test for two things usually:
1 Consistent detonations.
2 Achieved explosive effect.

Goal 1 is usually the primary aim. One wants to be able to reliably detonate the different parts of the bomb and achieve full detonation at once, and not have unnecessary unexploded rests or slow burning of the material before detonation.
The goal is to compress and confine the material to help it detonate at once.
And use proper amounts of explosives in different components of the bomb.

Goal 2 is often only something tested later, and this can involve measuring the fragmentation achieved at different distances or measuring penetration of material. Depending on the purpose of the bomb.

Bomb testing often involves handling of sensitive explosives, especially those for detonators. It is recommended to always quickly ground yourself by rubbing your hand on the ground or table, or earth outside.
This can be especially important when handling detonators which are sensitive by design.

At the start you want to test your ability of creating strong enough detonators to trigger other explosives reliably. Notice they need only be strong enough to trigger secondaries or booster charges.
Meaning you want detonators with sensitive explosives to be strong enough to trigger medium/insensitive secondaries, which will be a larger charge that generates the force to trigger the insensitive main charge.

If you can trigger the main charge using detonators then that's fine. Otherwise you can use booster charges, intermediary explosives, to lower the initiating force needed.
Again the detonator needs only be strong enough to trigger the main charge or intermediary booster charges you use.

I of course always recommend doing small scale explosions and moving up in size with experience, confidence and knowledge.

Once you have created reliable detonators, you want to start testing small devices and increase the size, to test, detonating a strong bomb, and possibly the explosive effect.

One aspect of assuring detonation is using several detonators. If you have a detonator which only succeeds 75% of the time, then initiating two detonators on the same charge has the chance of both failing being (0.25*0.25 = 0.0625) 6.25%, and thus likelihood of success at 93.75%

That's why when starting to test bomb production, you first test individual detonators to ensure they can reliably detonate the charges you need, including possible easier intermediate secondary charges.
Then you save on the detonators to focus on testing the main charges and achieving desired explosive effect and reliable detonation.
Of course you can throw in extra detonators on the charge to ensure certain larger or more demanding tests.
But lastly, when you are going to build the real bomb which might be larger or different than the tests, in this case you want to use many extra detonators (especially if they are not very reliable), to ensure detonation when the real attack is set.

Using RE factor is a quick way to calculate the needed amount of explosive.
Basically divide the needed TNT charge with the explosive's RE factor, to calculate needed explosive for the same effect.
0.1-0.2kg TNT for hand grenade charges. (similar to other fragmentation and antipersonnel weapons. But larger charge, larger potential fragments to spread, more killing power.)
0.1-0.4kg TNT (approximate) charges are used for anti-personnel mines (only strong enough to wound, not kill, immobilize the soldier and cause others to help him).
0.4-0.5kg TNT (in practice ca 0.7-0.8kg HMX) for RPG shaped charges.
4-7kg TNT for satchel charges and breaching charges (7kg being able to breach concrete bunker doors)
10kg TNT charges are used for anti-vehicle mines.
2200kg TNT is corresponding to the charge Timothy McVeigh set off, it is building razing level charges.

Further explosive and demolition planning can be explored in the US army manual FM 5-250 "Explosives and Demolitions":[80]
https://ia601608.us.archive.org/5/items/military-field-manuals-and-guides/U.S.%20Army%20explosives%20and%20demolitions%20handbook%20%28%20PDFDrive%20%29.pdf
This manual is particularly good if you have certain specific targets, there's detailed descriptions for targeting vehicles, bridges, etc.

When testing explosives most importantly you need distance and ballistic protection, especially if your testing fragmentation elements.

[80] "FM 5-250 Explosives and Demolitions", 30 Jun 1999
https://ia601608.us.archive.org/5/items/military-field-manuals-and-guides/U.S.%20Army%20explosives%20and%20demolitions%20handbook%20%28%20PDFDrive%20%29.pdf

If you just detonate a plastic bag or small detonators, then distance is usually sufficient and/or standing behind a tree.
But if the bomb has a metal or wood container, you should have a long fuse and ample time to stand far away and ideally have a literal wall to protect you, like standing around the corner of a building or similar.

Protective gear isn't usually an issue as you will ensure safety by simply not being around the bomb. But when preparing detonators you can use protective gloves. Though this is something that we did without in the army.

If a detonation fails:
First wait and observe, there may still be small embers or sparks in the fuze. Wait for at least 30 seconds or a few minutes before approaching the bomb.
Get close enough to observe if there's any heat or smoke left, if so back up. But if the detonator simply didn't trigger, then continue closer.

At this point there are two options, you either remove the detonator and toss it to the side and save the main charge (before trying to restore the detonator), or, you tape another detonator on the charge and try again.

Basically what you should never do is get too close before you can tell that there's no heat or smoke left.
And then you never try to fix the detonator while it is on the main charge (unnecessary risk).
You either remove it far away from the main charge, or you put another detonator on and try again.

Fixing detonators the safest way is to first remove it from the main charge, then pouring out the content of the detonator so it is not compressed and confined (and checking if any material did burn/redox at all), then making proper adjustments when assembling a new one.
If nothing burned it is likely that the fuze didn't reach or have contact with the primer.
If it did burn only slightly and did not detonate, this could be a sign that the detonator wasn't properly sealed, and the explosive material wasn't pressed in place in the detonator properly.

Devices

Detonators/Blasting caps[81] [82]

Detonators typically use sensitive powerful explosives like primers. And use around a few mg to 1g, using more is fine so long as everything fits and leaves space for the wires and safety margin.
But don't exceed more than 5g.

[81] "Detonators", Dugan Ashley, 26 Aug 2024, https://odysee.com/@DuganAshley:e/detonators:4
[82] "Dug's Detonator Secrets", Dugan Ashley, 14 Apr 2025, https://odysee.com/@DuganAshley:e/dugsdetsecrets:2

5g is more than sufficient to trigger secondaries.

I will generally describe detonators, but for visual aid and many details and tips, I highly recommend watching Dugan's two videos at reference 81 and 82.

A typical detonator is a small short metal cylinder, usually wide enough for a pencil.
These are filled with primers, and the primers are pressed tightly.

The primer is pressed most easily by placing it in a system that holds in place, all around it.
A simple way is taking a large piece of thick wood and drilling holes for the detonators to be placed in, and having a mechanical cylindrical arm pressing down inside it.
Make sure the cylinder match up in width as to leave little empty space.
And press slowly and carefully (don’t slam it), and press only as much as you can before it resists.
And always have distance and ballistic protection in case it detonates.

Now there are many different variants of triggering mechanics you can use:
Time delayed fuze, victim-triggered, electrical detonations, radio signal/digital signal, etc.

Time-delayed Fuze

Then a burnable wire/cord/fuze is placed fully inside, touching the primer.
And then the system is closed using pliers. Ideally use a plier with cylindric hole in the middle, otherwise using normal flat pliers work, just make sure to bend the edges around so the system gets as close as possible.
It is important here to have a sense of where the primer material is because you don't want to press it with the pliers.
The safest technique is having left a little safety margin (don’t fill the detonator completely) and mark where the primer material begins.
And then hold the detonator like a cigarette, in between your index finger and middle finger, with the explosive material pointing away from you. And then use the pliers to bend the metal around the fuze and close the system, press hard to keep the fuze stuck and in place.

This would be a simple time delayed fuze detonator.

Dugan has an extra layer plastic wire around the fuze to help seal it and protect the fuze from being clipped when closing it with the pliers.

Victim-triggered

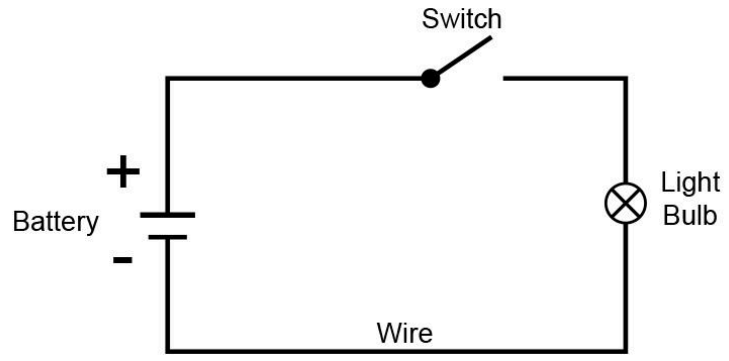
Victim-triggered are for example booby traps or mines.
Simply prepare a piston with a powerful spring cocked back (ready to press down into the detonator), with a safety pin. Then tie a cord (preferably a see through or plastic wire) and tie it tightly.
The idea being someone will accidentally step or pull on the cord, and remove the safety pin and allow the piston/hammer to fall down and hit the primer.
Mines work by having a weak spring keeping the piston up out of the detonator, and you yourself remove the safety pin once it is placed, and the victim will step on the platform pushing the piston into and pressing the primer to detonation.

Electrical detonations

Using electrical wires and placing them inside the detonator do also need to be kept in place by closing the detonator. Meaning you bend the metal of the detonator around the electrical wires to “stuck” them and close the system.

Electrical detonation is performed by closing a circuit at desired time and generating heat or electrical shock to trigger the primer in the detonator. Either by electrical load performing the task or short circuiting with exposed wires.

Short-circuiting batteries and generating a lot of electricity and heat through wires which will cause the primer to detonate, isn’t the most reliable option but is a possible one.
The most important is having a safety switch, you always connect the wires with a switch prior to connecting everything and the battery.
And make sure the circuit is open, meaning not closed, it cannot lead any electricity.
This is to avoid short circuiting when not desired.

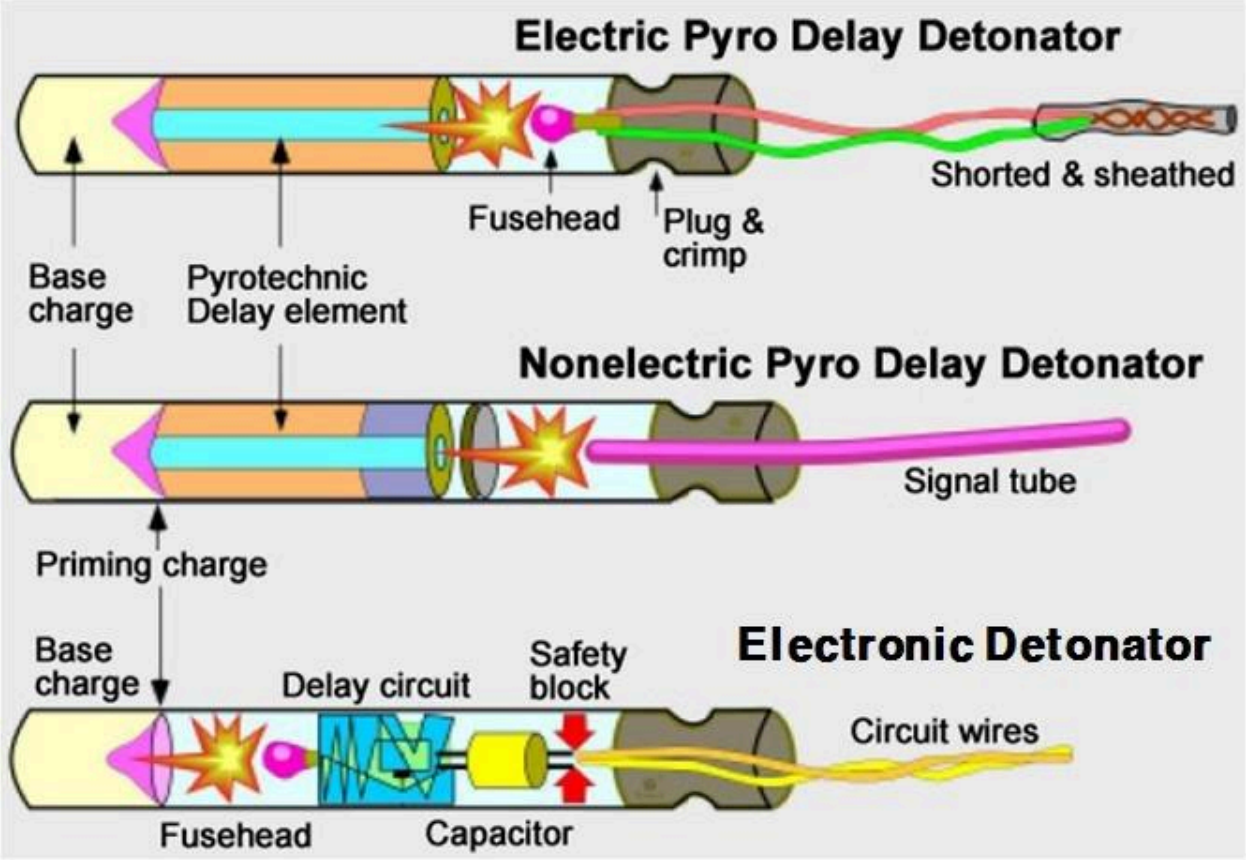


As you can see the light bulb cannot get any electricity until you close the switch.
So the switch becomes the button to trigger for the primer in the detonator.

Now in theory you could just have two exposed wires in the detonator in contact with the primer, and this could detonate the primer, especially if using a liquid explosive.
This would be short circuiting. It gives low resistance and thus an unrestricted pathway for the electricity and will generate a lot of electricity and heat.

You could also use exposed light bulb wire, because the electricity heats up the wire so much that it certainly triggers the primer.
So creating an electrically detonated detonator is very easy to improvise, just follow the basic circuit mentioned above.
You get a light bulb and remove the glass protection, exposing the light bulb wire. Then you get a strong enough battery for the light bulb, a safety switch and wires.
Connect it all, with the switch close to you and far away from the bomb so you can safely detonate it.
And place the light bulb wire in contact with the primer, then stand off and hit the switch.
Light bulb wire or ligament is more reliable than short circuiting.

But more professionally and reliable is using a fusehead. The fuse head heats up and causes sparks or "fire" which triggers the primer.



Again notice the "crimp", you do still bend the metal to "stuck" the circuit wire and you do that carefully to not clip the electrical wire. Slowly close with the plier and avoid pressing too hard when you feel resistance.
This picture also shows how to make it time delayed. By having a slow burning pyrotechnic chemical, which is ignited first, burns slowly and then triggers the base charge primer.

Digital/Radio Signal

When using electrical detonators it opens a whole new possibility of adding programmable computers to the system. This allows you to program what and when the circuit is closed.
You can for example build a switch which closes mechanically when the computer receives a certain signal.
Terrorists have classically used old cellphones. The idea is that they turn the phone off, and short circuit its battery by directing it with wires into the detonator.
And then once they call the phone (causing some old phones to turn on) the switch is closed and the battery short circuits and detonates the primary.
Such a model can be helped by incorporating into it stronger batteries, possibly light bulb wire/ligament, more reliable voltage and heat creation.

Basically you can program your own computer for the switch or use already existing computers like that (found in old phones or old radios/"walkie-talkies") depending if you want it to trigger on digital or radio signal.
And you can get creative at what, how and when it closes the system. You can add delay, like it waits 5 seconds before closing. Or it closes at a certain time or date. Etc.

Lastly I'll mention you could create altitude sensitive bombs like this, the unabomber was famous for doing this.
Tools like "altimeters" measure the altitude. And commercial airplanes fly around 9-12km up in the air.
So program a computer with an altimeter that closes the switch above 8km altitude for altitude sensitive bombs.

Here's a list of the best primaries to use:
NAP
SADS
Lead styphnate (I did not give a procedure for this, but it is what is found in primaries in bullets)
Lead picrate
Azides (can be made and is found in air bags)
Nickel Hydrazine Nitrate
Tetrazene
Xylitol Pentanitrate
Nitrocellulose
Gunpowder (I did procedure, and it is also found as the main charge in bullets)
Smokeless powder
Armstrong's mixture
HMTD
Liquid explosives

Peroxides

Higher up are the better options. The bottom two are liquid explosives and peroxides, these are easily made and only listed as last resort. I do not recommend using these for their extreme sensitivity. Peroxides, especially TATP is extremely sensitive even more so than liquid explosives.
But they are easily made and will definitely detonate. So if you have no other option you can use these. Liquid explosives and peroxides don't need to be pressed.

Further you can try many other different explosives for detonators, but it needs only not be an insensitive munition. It needs to some degree be sensitive or very sensitive to practically and easily detonate to fire or electrically generated heat when confined and pressed.

Here's the wiki list of possible primaries:

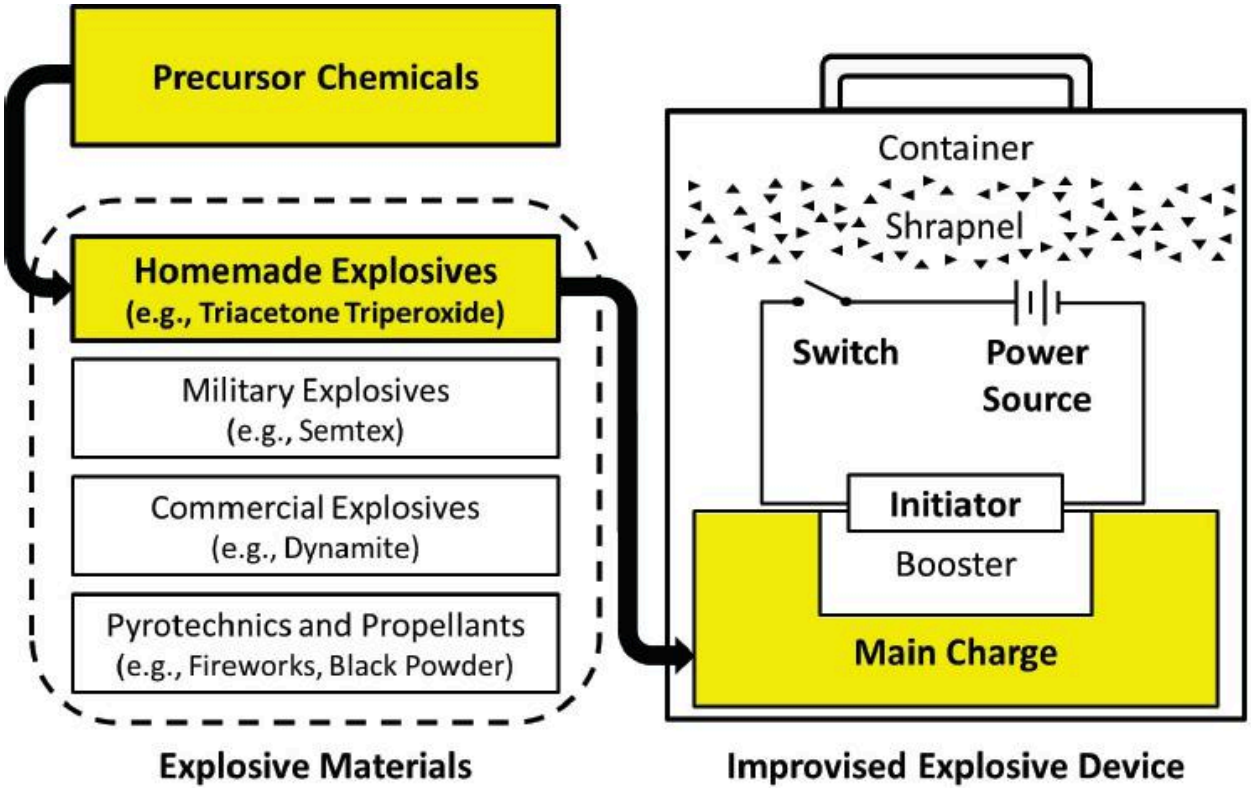
- Acetone peroxide
- Alkali metal ozonides
- Ammonium permanganate
- Ammonium chlorate
- Azidotetrazolates
- Azoclathrates
- Benzoyl peroxide
- Benzvalene
- 3,5-Bis(trinitromethyl)tetrazole[17]
- Chlorine oxides
- Copper(I) acetylide
- Copper(II) azide
- Cumene hydroperoxide
- Cycloprop(-2-)enyl nitrate (CXP or CPN)
- Cyanogen azide
- Cyanuric triazide
- Diacetyl peroxide
- 1-Diazidocarbamoyl-5-azidotetrazole
- Diazodinitrophenol
- Diazomethane
- Diethyl ether peroxide
- 4-Dimethylaminophenylpentazole
- Disulfur dinitride
- Ethyl azide
- Explosive antimony
- Fluorine perchlorate
- Fulminic acid
- Halogen azides:
  - Fluorine azide
  - Chlorine azide
  - Bromine azide
  - Iodine azide
- Hexamethylene triperoxide diamine
- Hydrazoic acid
- Hypofluorous acid
- Lead azide
- Lead styphnate
- Lead picrate[18]
- Manganese heptoxide
- Mercury(II) fulminate
- Mercury nitride
- Methyl ethyl ketone peroxide
- Nickel hydrazine nitrate[19]
- Nickel hydrazine perchlorate
- Nitrogen trihalides:
  - Nitrogen trichloride
  - Nitrogen tribromide
  - Nitrogen triiodide
- Nitroglycerin
- Nitronium perchlorate
- Nitrosyl perchlorate
- Nitrotetrazolate-*N*-oxides
- Pentazenium hexafluoroarsenate
- Peroxy acids
- Peroxymonosulfuric acid
- Selenium tetraazide
- Silicon tetraazide
- Silver azide
- Silver acetylide
- Silver fulminate
- Silver nitride
- Tellurium tetraazide
- *tert*-Butyl hydroperoxide
- Tetraamine copper complexes
- Tetraazidomethane
- Tetrazene explosive
- Tetrazoles
- Titanium tetraazide
- Triazidomethane
- Oxides of xenon:
  - Xenon dioxide
  - Xenon oxytetrafluoride
  - Xenon tetroxide
  - Xenon trioxide

Booster charges

As said before, booster charges are intermediate charges between the detonator and main charge.
The idea is that large main charges of very insensitive explosives require larger and stronger charges to set them off.
But of course you don't want to use a giant sensitive detonator, which is unsafe to handle.

So instead you have "secondary" explosives, these are powerful and often medium sensitive. They are not too insensitive and hard to trigger, and they are not too sensitive and unsafe to handle in large amount.

Again:
Detonator: small charge of very sensitive and powerful explosive. It is meant to trigger easily and trigger secondaries.
Booster charge: medium size charge of medium sensitive and powerful explosive. That is meant to trigger insensitive large tertiaries or main charges.
Main charge: cheap, insensitive and safe to handle explosives, the large charge which ideally is cheap and safe, sometimes using low to high power explosives.



This picture suggests using TATP as base charge which I definitely do not unless absolutely forced to. But it demonstrates a basic suitcase bomb which is electrically detonated. Notice however the switch is inside it and thus require some remote communication to detonate it safely. You can't just press a button in the suitcase to detonate it.

In practice the detonator is using a few milligrams up to 1g, but of course you can use more if it fits and works. But don't exceed more than 5g.
5g is more than sufficient to trigger secondaries.

The booster charges depend on how large the main charges are but more importantly what main charge is used.
I of course suggest testing this in bomb testing. To see if you can reliably detonate certain insensitive explosives.

Main charges can either consist of secondaries or tertiaries. The larger the charge the more fitting it is to use cheap insensitive tertiaries.
But if it is a regular small hand grenade size to medium suitcase or vehicle bomb, then the main charge can consist of secondaries. And you don't really need a booster charge.

So secondaries that are triggered by detonators can either be used as main charge for small-medium charges, or booster charges for large bombs.

Common secondaries are:
TEX
NTO
RDX
TNT
HMX
PETN
ETN
5-aminotetrazole
Tetryl
EDNA
Nitroguanidine
Nitrourea
Nickel Hydrazine Nitrate
Nitrocellulose
Nitrostarch
Guanidine Nitrate
Urea Nitrate
Picrates
Azides
Sugar alcohol nitrates (except XPN)
Liquid explosives
Peroxides
Higher up are the better options. The bottom two are liquid explosives and peroxides, these are easily made and only listed as last resort. I do not recommend using these for their extreme sensitivity. Peroxides, especially TATP is extremely sensitive even more so than liquid explosives.
But they are easily made and will definitely detonate. So if you have no other option you can use these. Liquid explosives and peroxides don't need to be pressed.

Of course there are many more secondaries, and many of these can be melt cast together or be balanced in other compositions.
But these are some that I have written procedures for.

You can basically use any explosive which is not too sensitive or insensitive. And is explosively strong enough.
Again these can be booster charges or main charges, it depends on how large the bomb is and what compromises need or should be made to keep it cheap and efficient.

Basic container for Pressure and Fragmentation

The basic bomb has a main charge and the goal is to compress and confine it, to maximize the density and pressure on the main charge, and an equal goal is to have a container which will break and fragment.

The basic bomb detonates the main charge all at once, because of the density, and builds up pressure due to the high pressure on the explosive. This causes a powerful release.
And then the container is fittingly either metal or wood, and includes small metal or wood fragments.
The container itself breaks and sends fragments, and/or the small fragments placed in the bomb will be launched.

Basically the basic bomb uses two elements to damage, the explosive shock wave, and the fragmentation launched with the shockwave.

Small fragments to add to the edges of the bomb to cause more fragmentation is:
Nails
Screws
Metal ballrings
Bolts
Really any small metal things can be added.

So the basic design is to prepare a metal or wood container, ideally with space in its wall for fragments, and the container can withstand pressure and the explosive secondary is densely packed.
The container should have a small hole for detonator fuses, and is mostly and tightly closed.
It can be completely closed and detonated from within with electrical detonation, if you send cellular, radio, digital signal from outside to close the circuit.
On top of this using several reliable detonators to ensure detonation.
And having the secondary be oxygen/pyro valence balanced.

The common example by terrorists is using pressure cookers.
The pressure cooker is a kitchen utensil quite literally designed to help cause pressure build up, and it has good space allowing a lot of explosive material inside it.

Main charges for small and medium sized explosives can use secondaries. I've listed secondaries in "Booster charges". But for larger charges I recommend using cheaper and insensitive tertiaries.
These would be:
Ammonium nitrate (and its compositions)
Methylammonium nitrate
Urea nitrate
Perchlorate compositions
Chlorate compositions
Sodium nitrate or potassium nitrate compositions

Using RE factor is a quick way to calculate the needed amount of explosive.
Basically divide the needed TNT charge with the explosive's RE factor, to calculate needed explosive for the same effect.
0.1-0.2kg TNT for hand grenade charges. (similar to other fragmentation and antipersonnel weapons. But larger charge, larger potential fragments to spread, more killing power.)
0.1-0.4kg TNT (approximate) charges are used for anti-personnel mines (only strong enough to wound, not kill, immobilize the soldier and cause others to help him).
0.4-0.5kg TNT (in practice ca 0.7-0.8kg HMX) for RPG shaped charges.
4-7kg TNT for satchel charges and breaching charges (7kg being able to breach concrete bunker doors)
10kg TNT charges are used for anti-vehicle mines.
2200kg TNT is corresponding to the charge Timothy McVeigh set off, it is building razing level charges.

I would say using above-mentioned estimates, that charges around 10kg and less should try and use secondaries, which are typically stronger than the tertiaries I've mentioned.
But when creating charges larger than 10kg then you might consider using cheap, insensitive and easily found tertiaries.

This is because at small-medium charges around 10kg or less of TNT equivalence, these usually have certain needs for sensitivity, power and brisance.
These smaller charges need certain explosive power; in part to damage what they are meant to, and to require a lesser amount of explosive which is more easily carried, thrown or launched.
These charges also need high brisance and detonation velocity to penetrate.
Lastly they need to have the right sensitivity, to not trigger too easily or with too much difficulty.

So ultimately again for charges corresponding to 10kg TNT or less, you should prioritize having secondaries as main charge, and these are listed in "booster charges".
These charges have very specific uses and thus require certain properties.
The proper sensitivity to detonate easily, and insensitivity to be safe to handle in quantity.
The proper bricanse and detonation velocity to penetrate.
The proper explosive power, to maximize damage and minimize weight.
And secondaries meet these requirements, while tertiaries would require large quantities and be harder to detonate.

But when constructing bombs that are not restricted by size and are just meant to destroy and generate energy, these are bombs suited for razing buildings or infrastructure, then you want tertiaries because these are cheap and easy to find or produce.
So when constructing a hand grenade obviously there's a natural restriction of weight for it to reasonably be thrown. But when constructing a car, van or truck bomb for example aimed to target a building. Then it is highly recommended to use cheap tertiaries.
Because in this scenario it's really a question of [explosive power]/[dollar], and using something insensitive which is safe to handle in those large amounts.

Now of course these are not rules set in stone. You could in theory for example prepare a bag with 10kg ANFO bomb, and these would correspond to ca 3-5kg TNT and could be used against small vehicles like cars.
But generally smaller charges need high performance explosives to easily deliver high power.
And generally large charges just maximizing damage consider more cost efficiency and safety.

Booby Traps[83] [84]

There's more or less an infinite amount of ways to improvise and prepare booby traps, for specifics and ideas I've listed reference 83 and 84. These show the many manual procedures the US army has come up with.
Now these describe improvised munitions and improvisable uses for munitions (formal and informal).
But large parts is about rigging military explosives. Now that information can of course be useful if one acquires such weapons, but they at least give ideas for mechanics, and how to improvise a booby trap even without military explosives.
I also think the person reading this who is in the military now can learn more ways to use their weaponry.

Some booby traps employ fragmentation and some don't. Less fragmentation relies more on explosive power.

But booby traps fundamentally are victim-triggered devices. These usually involve two basic mechanics I've described in "Victim-triggered":
1 Victim removes safety pins.
2 Victim pushes piston/hammer into detonator/primer.

Mechanic 1 is usually performed by either, tying a wire to the safety pin which the victim accidentally steps on or pulls, or, applying a resistance to a safety pin which has a spring and the victim unknowingly removes the resistance.
Examples:
A hand grenade taped to a tree (under the spoon) with a wire tied between the safety pin and a tree, the victim walks by, accidentally pulling the safety pin and the grenades goes off
Or

[83] "FM 5-31: Boobytraps", 1965, https://archive.org/details/milmanual-fm-5-31-booby-traps/mode/2up
[84] "TM 31-210: Improvised Munitions Handbook", 2007 (edition), https://archive.org/details/usa-tm-31-210-improvised-munitions-handbook/mode/2up

A hand grenade placed in a glass, with the safety pin removed, and the spoon safety kept by the glass, and the grenade placed on top of a door, the victim opens the door, the grenade falls on the floor, the glass shatters and the grenade explodes when the spoon is released.

So to create these kinds of mechanic 1 there's two options:
1 You have a piston/hammer with a strong spring cocked and ready to hit the primer, kept in place with a safety pin.
2 A safety pin like in option 1 stopping the piston/hammer, but the safety pin itself has a spring to pull itself out, and is kept in by resistance.
A hand grenade has both types of safety pins, the spoon and the regular safety pin. If you design number 2 remember to design a number 1 also, so it has both like a hand grenade for safety and handling purposes. Otherwise you can do just 1.

Mechanic 2 is usually performed by one set up and that is like a mine. The piston/hammer has a spring pushing it away from the primer, and the victim steps on the top or platform of the mine and pushes the piston/hammer into the primer and detonates it.
For these designs I recommend having a safety pin still so there's no chance of accidentally pushing or hitting the piston/hammer into the primer.
And this safety pin is removed once you've placed and disguised the mine.

A key feature is the disguisement. In rural environments using leaves and sticks, and placing them behind trees or rocks, can make it more or less impossible to predict or spot the explosives.
For mines you want to bury them just underneath the surface of the ground, and you cover the top portion sticking out with a leaf, this is impossible for a regular infantry man to deal with.
And in practise what would happen is either:
They would need to bring eod with metal detectors to safely demine the area.
Or they bring combat engineers that use "snake" explosives (long explosive rope you shoot out and detonate), these blow up any mines close to it and create a narrow path through the mines.

But again mines are extremely annoying to deal with for this purpose, they are hard to predict and can likely cause a few wounded or deaths, and immediately halt a platoon or even a company, and force them to help wounded, create pathways out of the mined area, call eod or combat engineers to clear the area, etc.
Mines/booby traps are so far extremely effective and annoying.
And if fighting against the police I can only imagine it is more so because they would not be as routinely trained and have the same equipment to deal with such a threat.

Now in urban areas, I suggest using disguising with backpacks, cardboard boxes, behind or on top of doors, underneath cars and tying to lamp posts, etc.

Car Bomb

Electrical detonations involve short circuiting batteries, similarly can you make a bomb which detonates when a car is started by short circuiting the car battery.

Basically you open the hood of the car, and place the bomb inside it.
Then you can use jump starter cables to connect the car battery with the fuse head or lamp filament (the initiating heat source).
You connect the black cable on the negative pool of the car battery, and you connect the red cable on the positive pool of the car battery.
Then you close the hood.

The voltage on a car battery is around 12V and will definitely explode violently when short circuited.
So prepare a light bulb wire or fuse head, or similar element which will heat up with the current.

The bomb placement should either be directly underneath the hood or behind the engine parts, and close to the driver area.
Including fragmentation, like a nail, bolt, screws, etc, loaded bomb, helps the likelihood of killing the driver.

The above mentioned car bomb is the best way to kill people in a specific vehicle.
But there's another method which is the anti-vehicle mine, these normally do not use fragmentation.
Meaning you place a mine on the road or buried in the ground, and when the car drives over it, it pushes the piston/hammer into the detonator. And it uses the brute force of the explosive to destroy the vehicle.
A 10kg TNT equivalent mine is enough to destroy an unarmoured vehicle, and will damage the wheels/tracks of an armoured vehicle.

Basically you make a mine with a charge of 10kg TNT equivalent, and you place it on the road you expect the enemy to drive.
Notice however you need several of these mines to ensure that one is hit, and you should bury them in the ground to masque them.
And the spring keeping the piston/hammer up can be a lot stronger than for an anti-personnel mine because a car applies a lot more force.

When placing anti-vehicle mines you can do two patterns:
1: Zig-Zag pattern, with enough distance, this has a high likelihood of being hit, and it can be hit many times without risking triggering other mines.

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.   .   .
 .   .   .
.   .   .
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They are far away from each other and with slight variations in the pattern.

2: Straight pattern, this will ensure a hit, but works basically once.
.
.
.
.
They are all next to each other over the road.

As you can notice, to kill people in a specific vehicle and destroy a specific vehicle you want a regular car bomb.
But to kill and destroy vehicles and hinder them from using roads you use anti-vehicle mines, but this is more costly, requiring a lot of them to effectively mine roads.

So for assassinations, regular car bombs, for armed conflicts, anti-vehicle mines to mine roads.

Now there's quick ways to immobilize a vehicle, if your goal is simply to make the cars inoperable.
Sometimes it is hard to set up explosions to kill the people in the cars.
But it is very simple and quick to sabotage the enemy instead. And this is done by vandalizing the vehicle instead.

So to vandalize/sabotage/immobilize a vehicle quickly and easily: (these can also be done in conjunction)
1 Siphon the fuel, simply put a garden hose into the fuel tank and suck the gasoline out, once it begins pouring out you place the beginning of the hose into the gas canister.
Now notice that some fuel tanks have locks or filters to block solids and siphoning theft, so bring tools like lock cutters, long small sharp metal sticks to penetrate the filter.
(Notice you can also steal other useful car fluids, starter fluid, anti freeze, battery acid, etc)
2 Puncture tires. Use a knife or screwdriver.
3 Burn the car, cars consist mostly of burnable material, so smash the windows, pour accelerants in and throw a lit match or torch into it.
4 Place jump start cables, black on negative, red on positive, and connect them with a wire, next time the car is started the car battery shorts circuits immediately and can start a fire.
But the battery is unloaded and can't be used without being recharged.
5 Pour a lot of water into the fuel tank, diluting the fuel and making it not burn properly in the engine.
6 Steal registration plates.
7 Block exhaust pipe, for example aluminium cans can be used to make a large bendable aluminium surface which can be glued on or inside the exhaust pipe to block it.
This causes carbon dioxide and monoxide buildup and it can enter the vehicle, and ideally knocks the driver unconscious when driving.

Bus Bomb

A bus bomb is an easy way to kill many people and disrupt public transportation. The idea is simply to get on the bus and leave a bomb disguised in a backpack or suitcase. And then once you've left the bus it detonates and does a lot of damage.

Now this can be done for trains as well. In fact doing it on trains is probably more effective, more tightly packed people, and once the train is bombed it causes a larger disturbance in the public transportation system, it will likely cause an entire railway to be blocked for at least the entire day or more.

But notice both buses and trains nowadays have cameras on them, and some bus stations and all train stations have cameras. And of course there's likely cameras on streets, possibly close to the bus or train stations.
You need to cover your face and use gloves. For example, black leather gloves, hoodie, sunglasses, and corona face mask.

Now for maximum damage you want to do it on rush hours, when the buses or trains are fully packed, it makes you stand out less, and they won't notice when you leave your bag.

Either you enter, plant and leave on an important station (those expecting a lot of people).
Or you enter, plant and leave on stations prior to the important ones. This will mean the bag is left there a longer time and awaits the tightly packed crowds.
And it does give you a longer time to escape.

Truck Bomb

Truck bombs refer to the idea of filling a truck with a huge charge of explosives. Like Timothy McVeigh who filled a truck with ANNM and it razed 1/3 of a government building and killed hundreds of people. The truck allows to prepare a very large charge and then drive it to a certain place, and it has the natural disguise of the truck.

The bomb Timothy McVeigh prepared was equivalent to 2200kg TNT.
These kinds of bombs use such large charges it is best, most cost effective and safe to use tertiary explosives.
Timothy McVeigh used ANNM (and a lesser amount of ANFO).

ANFO is the most commonly used charge in general.

Again good tertiaries are:
Ammonium nitrate (and its compositions)

Methylammonium nitrate
Urea nitrate
Perchlorate compositions
Chlorate compositions
Sodium nitrate or potassium nitrate compositions

McVeigh's method:
Detonator: Two sets of time-delayed fuze detonators. (he stole 500 detonators, so he used probably many hundreds)
Booster charge: 160kg Tovex (stolen from a quarry site)
Main charge: ca 2041kg ANNM, and 907kg ANFO.

The main charges were packed in metal barrels and he included in them acetylene cylinders.

Some reflections on truck bombs:
The amount of investigative resources dedicated to these kinds of bombings are massive, so you would need to disguise yourself, and keep your internet and credit card activity clean.

The ideal is to steal all the explosives you need. These kinds of materials are found in mines and quarries.

Using acetylene, propane, or similar gas tanks is a good idea, but I suggest balancing this also. These gases are fuels. And so one should have oxygen tanks also.
And the placement should be next to any barrels with the main charges, not inside.
I would suggest having fragments inside the truck which helps to pierce the gas tanks.

Detonators should be used in large bundles or sets.
It is maybe possible to incorporate the truck battery to create a large electric detonator.
Basically connect jump starter cables, black to negative and red to positive, and then lead them through holes into the storage space with the explosives, and you connect it to a powerful fuse head or exposed light bulb ligament.
And this electrical set up can be connected to the secondary, and detonator fuzes.
That way if it somehow isn't able to trigger the secondary, there's many short fused detonators being lit.
But then you would want some function to close the circuit, either some machine to turn the key or press the button. Or you could just have a programmable switch connected with the wires, and you turn the truck battery on closely to the attack, and it won't denotate until the extra switch closes.

160kg Tovex corresponds to (160*0.8) 128kg TNT.
So your booster charge needs to correspond to ca 128kg TNT. At least this amount provably worked.

Now lastly and importantly:
McVeigh just straight up parked the truck outside the building and was able to destroy 1/3 of it.

But these bombs can do a lot more damage inside/under the building. So if possible try to find a parking space inside the building, ideally close to the ground floor.
The reason is that this placement allows more of the bomb's energy to be applied to the building, instead of mostly one side, it becomes all of the energy from the bomb.
So getting the bomb inside the building makes it drastically more effective, and keep it at ground floor and in the middle, ideally where there's a bunch of important supporting beams.
Typical targets would then be for example a shopping mall which sometimes have these parking spaces built inside of them, though a truck might not fit inside, in that case use many van's filled with explosives instead.
Though I think the best targets would be governmental/state entities and their buildings because it would quite literally cripple the government's leading capacity if it has important targets or administration in that building.
But be prepared that a government building with parking inside will likely have security, and you cannot lie your way in, so the best option is to drive up, kill the guard, and quickly place the truck and set the timer, then escape.
But if you have to detonate the truck outside the building, then do it on the widest side and do it close to the building.

Letter/Package Bomb

Before starting any attempt with making letter bombs, which are mailed:
You need to wear surgical gloves, and a corona face mask. Because you cannot and should not under any circumstance risk leaving fingerprints, hair or saliva, or DNA, on the package.
If it gets intercepted and they can tie you with the package where explosives are found, they will arrest you immediately.
And you can clean the package content and the package outside areas with a rag with ethanol, and another rag with bleach.
Wiping it over with slight ethanol, letting it dry, and then wiping it with bleach, these help remove any fingerprints and DNA.

So as most of us are familiar with, Theodore Kaczynski was able to deliver many bombs using the postal service, and naturally with time they have added more security measures to intercept explosive packages.
In modern times drug/explosive sniffing dogs are used more routinely, and they have begun using x-ray machines to scan certain packages.
Now these measures are normally done in predictive measures, so they don't scan everything but instead use certain factors to identify high risk packages and check those.
But that applies to normal post offices.
Packages that travel via airports and airplanes will most certainly be checked by dogs and/or x-ray machines.

The factors that determine risk and likelihood to be checked are:
1 International packages.

2 Misspelled addresses or names, etc.
3 Anonymous, known dangerous sender, or weird sender names. Basically unknown, dangerous or weird origins of packages.
Return addresses not matching or existing in the area they are sent from.
Or no return address.
4 Recipient is a specific individual in government body or institution, rather than a branch or department.
5 Excessive postage. Using many postmarks suggests the sender didn't send over the counter, and thus used excessive stamps to be sure it would reach.
6 Handwritten labels, instead of printed ones.
7 Stains, wires, strange bulges, a lot of weight, uneven weight distributions.
8 Package origin is from remote locations rather than cities and over the counter.
9 Decleared content doesn't match x-ray check.
10 Any background information or contextual information, this is provided by law authorities or intelligence services, and this is most relevant if you do repetitive bombing by mail, because they will start trying to identify patterns and give directives to post offices.

The basic and most important rule of thumb to successfully mail a bomb is to have it be like any other package. And the second is to use some disguising measures in case it gets sniffed or x-ray.
Now you can prevent dog and x-ray checks by making the package look normal which is something easy and immediate you can do.
And countermeasures to dogs and x-rays are more specific.

So when a package is deemed suspicious it will be flagged and will be sniffed by dogs, and/or x-rayed.
And if the smell or insides look suspicious then it will likely have a manual inspection. Though if they are sure it might be a bomb they will call the police.
Manual inspections are more used if they suspect drugs, to test if it is illegal narcotics, but when its explosives it depends on what the package looked like inside, but if it's clearly a bomb then the police is called.

Commonly a lot dogs are trained specifically for nitrogen-based explosives, but those for screening processes are usually taught more broad smells and can detect peroxides and oxidizers.
But as a tip, non-nitrogen based explosives usually have a higher likelihood of making it through, especially if they smell like other common things.
For example chlorates, perchlorates smell more like bleach than TNT.
Ethylene glycol dinitrate is often cited as odorless, and though it leaves small trace vapors which dogs might detect, odorless explosives are less detectable and easier to cover up than those that do smell.
Sugar alcohol nitrates like, xylitol pentanitrate, mannitol hexanitrate, sorbitol hexanitrate, erythritol tetranitrate, are generally reported as odorless.

But the best and most important counter measure to dogs is sealing the package air tightly which blocks a lot of smell.
So vacuum seal and seal air tightly.
One can also use perfumes, deodorants or spices, or coffee to create cover smells.

For x-rays there's two methods to hide the parts of an explosive device.
The parts you want to hide are primarily the battery, wires, electronics, metal shaped.
Method 1: is to cover it with aluminium foil, mylar bags, metalized films, lead foil, leaded plastic, metal cans, carbon paper, thick clay, ceramics.
These materials help block x-rays and can create misleading x-ray pictures, for example ceramics making it look like ceramic plates when underneath is an aluminium sealed bomb.
Method 2: is to hide the bomb inside or part of electronic devices. Like for example a toaster, electronic tooth brush or shaver, blenders, etc.
Really any electronics where a battery is expected, and wires, etc, and the explosives themselves can have aluminium foil bits on them to confuse the picture just on them.

The proper amount of explosives to kill with fragmentation is around 0.1-0.5kg TNT equivalent. At 0.5kg TNT equivalent you surely kill them with fragmentation. And 0.1-0.2kg range is more like a hand grenade and has a good chance to kill.
But notice that a package is close to the victim when opened and has good coverage of their body. There's a large area for the fragmentation to hit them.
So it is going to be more effective than a hand grenade or anti-personnel mine detonated at a distance or close to feet.
So the range 0.1-0.5kg TNT equivalent has a reasonable chance to kill. Especially with fragmentation of wood or metal parts.

And one should use primaries and secondaries for these kinds of bombs. It needs explosive power to launch the fragments efficiently and to avoid being too heavy.
Though if using primaries, seal them properly to avoid accidental detonation, as it can happen when being delivered by the post service that doesn't always respect the content of the package.

Triggering mechanics:
So letter bombs need to be victim-triggered.
The idea being there's a safety pin which the victim unknowingly pulls out. Or the victim unknowingly moves a part to close the circuit for an electrical trigger.
Some example ideas being:

1 The bomb is in a wooden box, and when the lid is lifted, the safety pin which is glued to the lid is removed.
This would be easy to prepare also, just build the wooden container upside down, with the lid in place with a security pin. Cock back the piston/hammer with a loaded spring, and place the security pin in. And then assemble the bottom of the wood container.
Just make sure everything will stay put once you turn it over, or when the box is flipped. Maybe have a locking mechanism on the outside so it doesn't open while being transported.

2 Is to use a string which is tied to the safety switch, and goes through the container in a small hole, and is glued to the package. And so when someone pulls the papers off they can easily pull the string and safety switch out.

This works better if the string is attached to the opposite or bottom side of the package to where the tape and folded parts will be, basically the opposite side to where the package is closed.
Because the victim will tear or use a letter knife to open the top, but for the bottom he is more likely to just pull.

3 A possible electrical trigger could be, if you have a wooden box container for the bomb. Is to have outside locking mechanisms, locking a (the only) movable part of the box (it has no lid), and once the victim moves the movable part, he is moving a battery into and closing the circuit.

4 A clever method could be to send an electrical tool or toy, with a bomb in it. With or without batteries. And once they put batteries into the tool it closes the circuit. And you could either have it short circuit on the explosive material or an electrical trigger mechanic like lamp filament heats up.

But of course here one can be very creative, the only restriction is that it needs to be victim-triggered, and you need to consider how you are going to assemble it.
Ideally leaving little option, only allowing the pin to be pulled unknowingly.

Bag/Suitcase Bomb

These are bombs masqued by being placed in bags or suitcases, and the explosive charge can be rather large because of the space available from bags or suitcases.
These are common and important because they allow transporting strong bombs in public spaces.

Other items that can be used to disguise and transport bombs are:
Cardboard boxes, plastic bags, colored plastic bottles, colored glass bottles, beer cans, etc.

Basically anything and everything that is expected or normal on public streets.
Backpacks and suitcases have been used so much in terrorism history so it’s seen as a suspicious factor. You are definitely going to be observed (and marked as suspicious) if you go to a political event or crowd with a backpack, especially if you use identity covering clothes, like gloves, face masks, caps, sunglasses, hoods, etc.
So I would almost consider using just plastic bags now, more normal. And placing small charges in glass bottles or beer cans (or just aluminium cans).

Thermos Bomb

Like pressure cookers these withstand pressure. But they also have empty space in the walls. Meaning you can break it open to fill the sides with fragments (nails, bolts, screws, etc). And the thermos itself is filled and prepared as an explosive.

Pipe Bomb

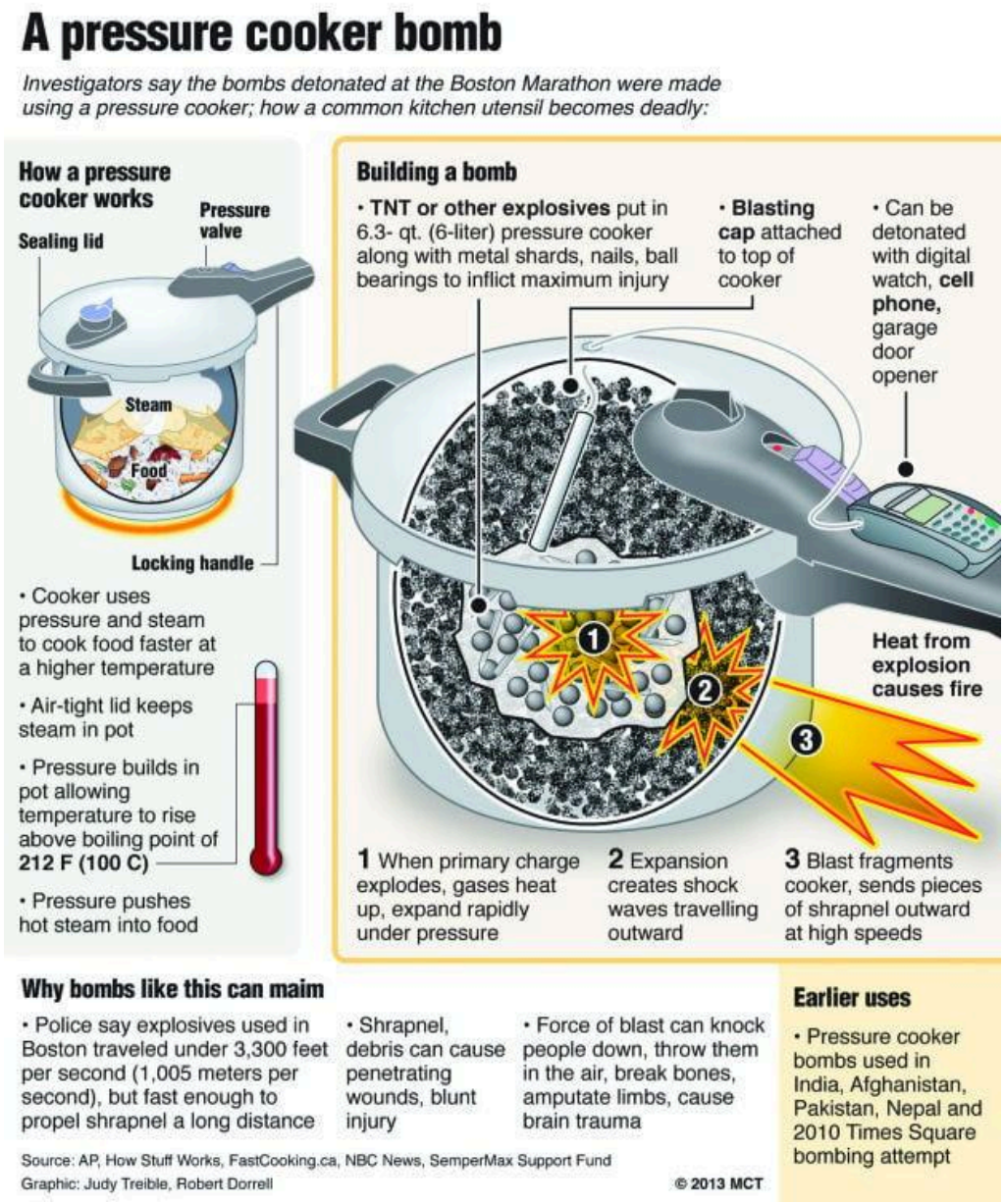
The cheapest and a very hard to trace bomb is the pipe bomb. It is quite literally just a metal pipe, which can be picked up at any scrapyard, and just find mental parts to seal it up and drill a small hole for the fuze.

Here's a classical improvised remote controlled bomb.

Metal pipes for pressure build up.
Tightly sealed but has two holes allowing the electrical wires. Can use glue on those holes to hold the wires in place and seal it even more.
The old phone is turned off, but once it is called it turns on and will close the circuit. Either short circuiting wires or trigger a fuse head, light bulb wire, or other heat source.

The ideal would be to have a high performing secondary explosive as base charge and have it be oxygen balanced with another explosive.
And a reliable primary/detonator inside. Possibly using a few extra to ensure detonation.

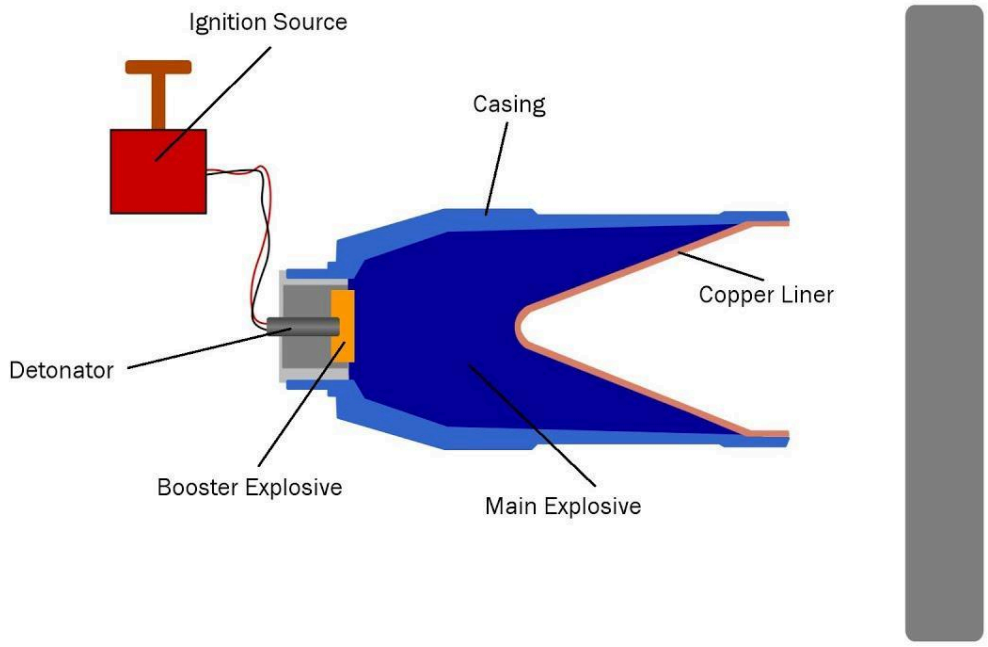
Pressure Cooker Bomb


A pressure cooker bomb
Investigators say the bombs detonated at the Boston Marathon were made using a pressure cooker; how a common kitchen utensil becomes deadly:
How a pressure cooker works
Sealing lid
Pressure valve
Steam
Food
Locking handle
• Cooker uses pressure and steam to cook food faster at a higher temperature
• Air-tight lid keeps steam in pot
• Pressure builds in pot allowing temperature to rise above boiling point of 212 F (100 C)
• Pressure pushes hot steam into food
Building a bomb
• TNT or other explosives put in 6.3- qt. (6-liter) pressure cooker along with metal shards, nails, ball bearings to inflict maximum injury
• Blasting cap attached to top of cooker
• Can be detonated with digital watch, cell phone, garage door opener
Heat from explosion causes fire
1 When primary charge explodes, gases heat up, expand rapidly under pressure
2 Expansion creates shock waves travelling outward
3 Blast fragments cooker, sends pieces of shrapnel outward at high speeds
Why bombs like this can maim
• Police say explosives used in Boston traveled under 3,300 feet per second (1,005 meters per second), but fast enough to propel shrapnel a long distance
• Shrapnel, debris can cause penetrating wounds, blunt injury
• Force of blast can knock people down, throw them in the air, break bones, amputate limbs, cause brain trauma
Earlier uses
• Pressure cooker bombs used in India, Afghanistan, Pakistan, Nepal and 2010 Times Square bombing attempt
Source: AP, How Stuff Works, FastCooking.ca, NBC News, SemperMax Support Fund
Graphic: Judy Treible, Robert Dorrell
© 2013 MCT

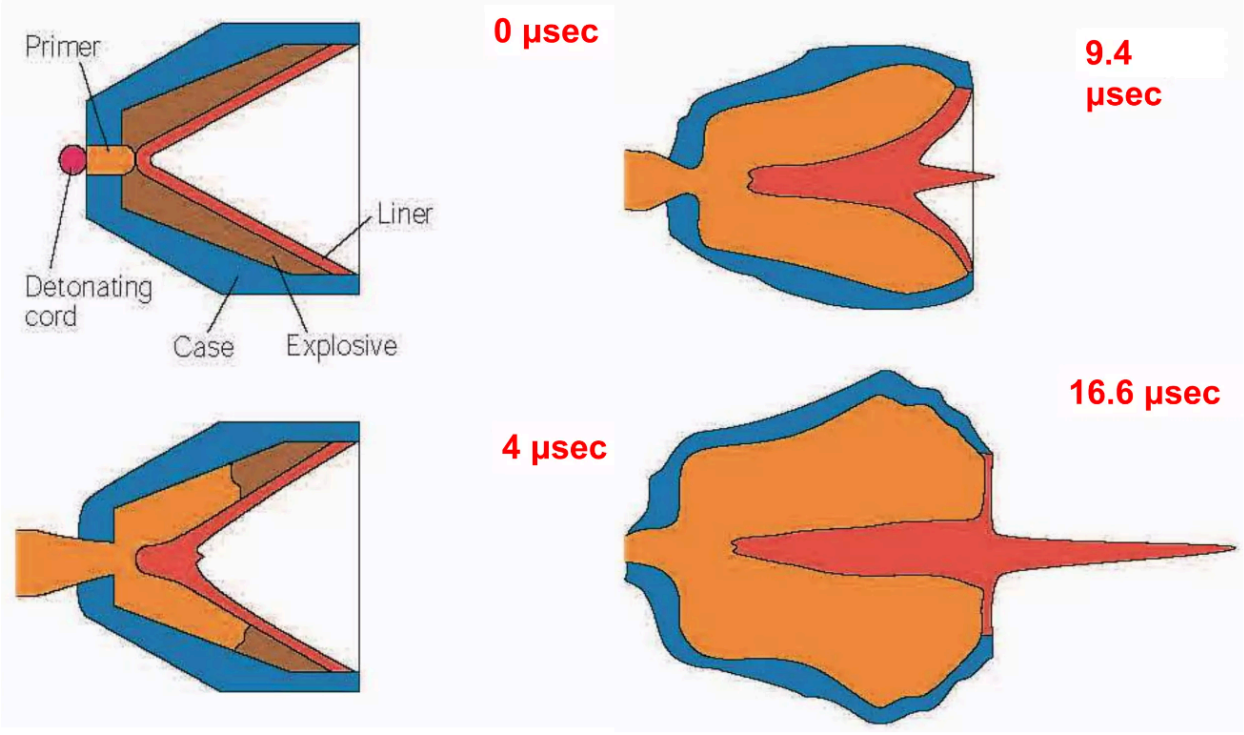
Notice in these builds they have the fragments (nails and ballrings) in the same “compartment” as the explosive.
I would highly recommend separating the two by some physical metal barrier.
Both can be in the pressure cooker, and it would make sense because you can really fill it with fragments. But then you want one compartment for explosives and one compartment for fragments to avoid any reaction between them.

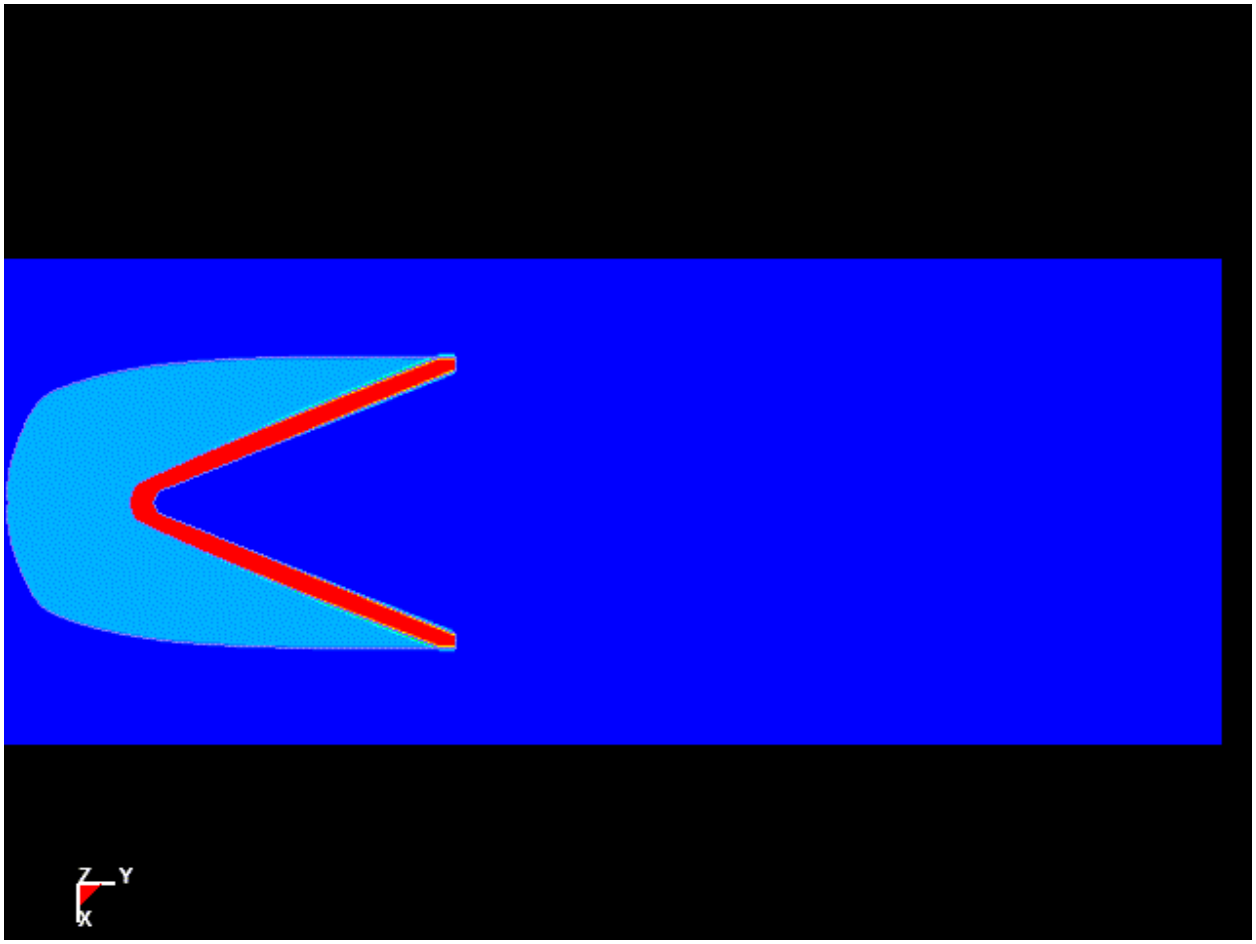
Shaped Charge

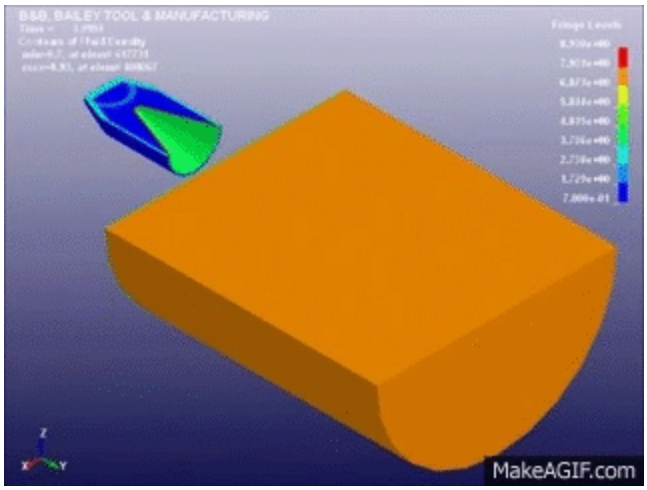
An explosive in which the energy is focused in a particular direction. Shaped charge is used when a barrier needs to be breached with a limited amount of explosive.
The goal is to launch a projectile and concentrate the mass onto a small surface area, increasing the pressure and force by which it hits the surface area.
This is done by placing a cone shaped material into the explosives opening, with the top pointing inwards (meaning the vertex point).



Usually shaped charges are made of copper, like in the above example.

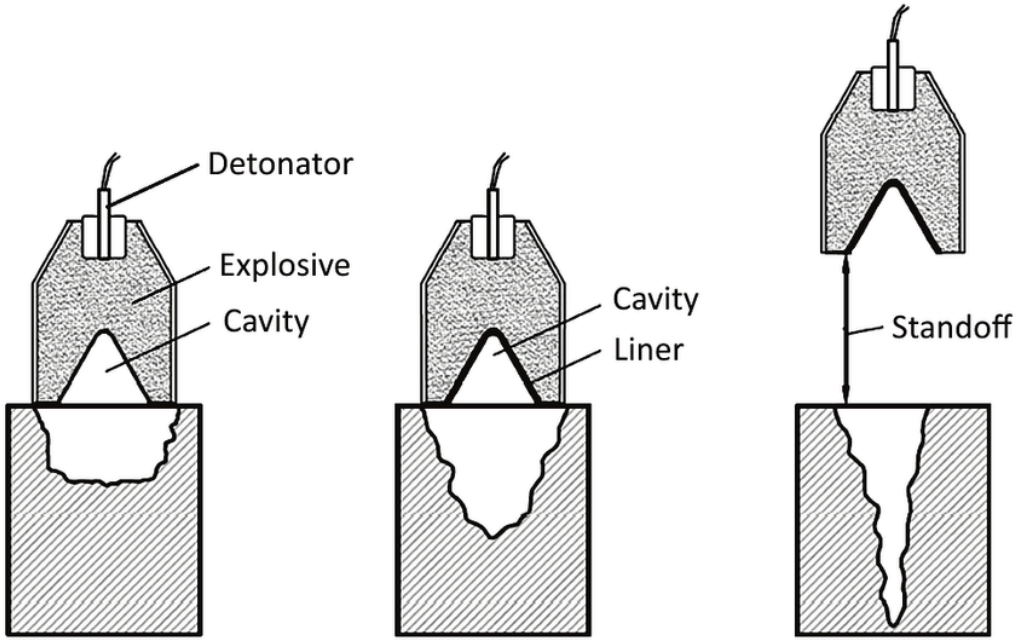




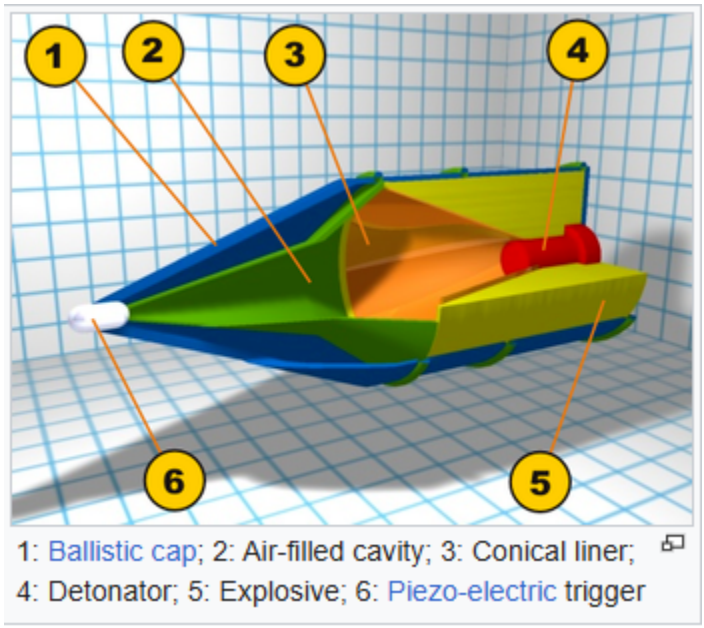


So again the reverse cone shape causes a very small “jet” stream. It shoots a very concentrated stream with a small tip, of normally copper.
The small contact surface, high speed, and continuous stream following behind.
Generates high force per area and thus great pressure and penetration.

These types of charges are implemented for breaching concrete pillars or armour piercing ammunition. Basically when you need to pierce hard layers. This is sometimes easier by concentrating force into small points rather than using unconcentrated brute explosive force of explosives.
You concentrate the force by shooting a bendable metal like copper into a small continuous stream.



Notice though: that it takes time and space to build up the jet. This means you don't want the shaped charge opening in contact with the target.
You want some space in between to ensure the jet has reached its optimal state before hitting.



1: Ballistic cap; 2: Air-filled cavity; 3: Conical liner;
4: Detonator; 5: Explosive; 6: Piezo-electric trigger

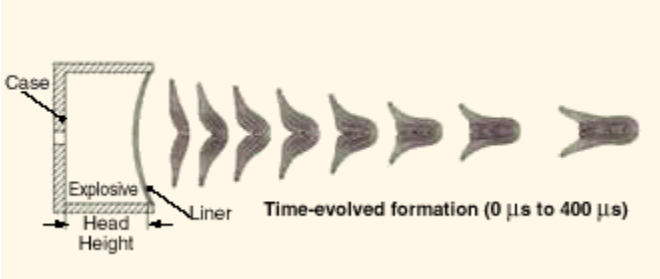
This is the head of a standard rocket propelled armour piercing round.
As you can see there's some space between the tip to the left and the cone liner. Most of this is empty space. This provides some space for the jet form.
As the trigger is hit, the explosive detonates and the jet starts to form, and the extra space between the cone liner shaped charge and the tip (and target) provides more time and space for the jet to form. And then it penetrates even better.

The triggering mechanism can be something quite simple, like a button on the top which closes a circuit for electrical detonation, and one can have a safety pin for this so no accidental bump triggers the charge. It needs only be triggered on impact, and electrical detonations send electrical signals and can trigger detonators fast.

So there are certain factors that affect the penetrating property.
And shaping charges with liners can focus on different properties. For example: you can optimize for penetration, or wide surface damage, or something in between.
The need depends on the target:

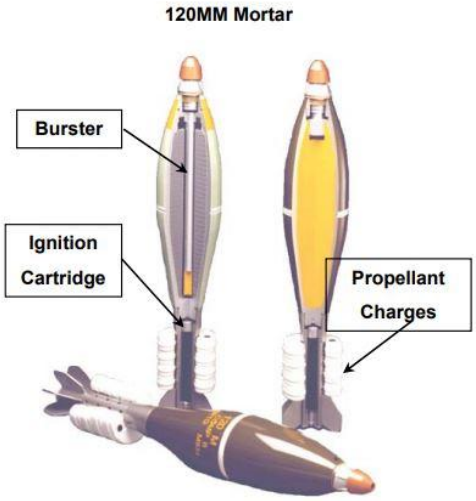
1 High armour vehicle target: You want to maximize penetration.
You want the above-mentioned RPG shaped charge.
A sharp angled cone metal liner.

2 Low armour vehicle target: You want to maximize wide surface damage (or even fragmentation).



Notice the wide angle, which results in a wide jet. The wider jet penetrates less but does more surface damage.

And if you go for fragmentation:



A mortar round is something which detonates on impact, and spreads fragmentation of metal shrapnell. These are good against infantry and low armour vehicles.

3 Concrete pillars: For these you want linear shaped charges. These are “something in between”. The idea is that these are long lines of triangular metal liners. These have sharp shaped charge liners for penetration, but long surface area. The idea is to decapitate (rather than puncture) the concrete pillar.

So for structural targets, use linear shaped charges, they are small and have sharp angles for penetration, and long length to decapitate. These are fitting for cutting through structures of steel and concrete.

Maximizing Factors for Penetration: (CD stands for charge diameter.)

Shape: Cone
Liner material:[85] Copper
Liner thickness: 2-4% CD
Angle:[86] 40-60° (reference 86 found 42° to be the optimal angle)
Space between charge and target: 1-3 * CD (reference 86 found 2.5 CD to be optimal)

[85] “A Review of Works on Shaped Charges”, Ahmed and co, 2017, https://etasr.com/index.php/ETASR/article/view/1532/625
[86] “A practical review study on shaped charge in the last two decades (2000-2020)”, Mehmannavaz and co, 2021, https://doi.org/10.1177/20414196211017923 or https://www.pismin.com/10.1177/20414196211017923

Maximizing Factors for Surface Damage: (CD stands for charge diameter.)
Shape: Half circle
Liner material: Aluminium
Liner thickness: 4-8% CD
Angle: 90-140° (maximum surface damage and least penetration is found at 140°)
Space between charge and target: 3-7 * CD
(This kind of "jet" is often called an explosive-formed penetrator (EFP), which is a kind of wide and round "jet".
It works better at slightly longer distances because it takes longer time to form in the air, and it is suited for shooting over longer distances because it keeps its form in the air longer.
It doesn't break down to the air resistance like the normal jet).
(Again EFP can be shot at a long distance and do a lot of surface damage, which is good against low armour vehicles.)

Linear Shaped Charge Factors:
Shape: Triangle
Liner material: Copper
Liner thickness: 10% of the width
Angle: 60-90°
Space between charge and target: 0.4-1.2 * width
Width: 3-10 cm
(Keep the width small, to decrease surface area.
And only use as much length as needed)

So overall there are three different weapons:

Copper-cone shaped charges forming jets:
These weapons usually have a head with proper empty space between the top and charge to allow the jet formation.
And these weapons are either placed on the high armour target and detonated, or more commonly in modern times, rocket propelled into the high armour target, where it detonates on impact. Having the jet formation close to the target.

Aluminium explosive-formed penetrator:
These can be placed on the low armour target and detonated, but more fittingly they are often detonated at a distance (short or long), and the EFP forms immediately and travels through the air to the target.

Copper linear shaped charge:

These are always placed on the structural target with slight distance between the target and charge.

Glass Bottle Shaped Charge

A quick improvisable shaped charge is simply filling a glass bottle (like a wine glass bottle) with explosives.
The bottom of the glass bottle has a conical shape pointing inwards, towards the explosive.

The penetrating effect of these have been studied and demonstrated, and so a glass bottle explosive can generate fragmentation to the sides and penetrate to the bottom of it.[87] [88]

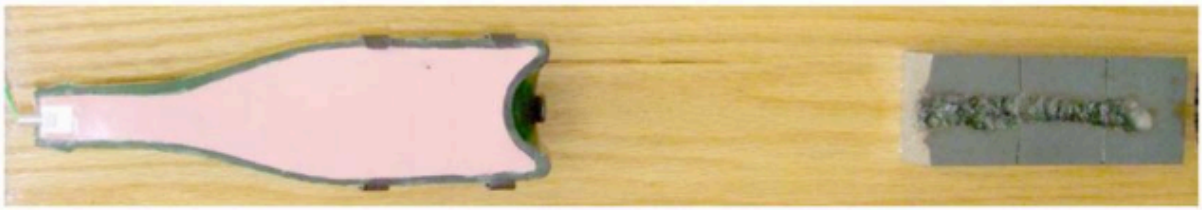
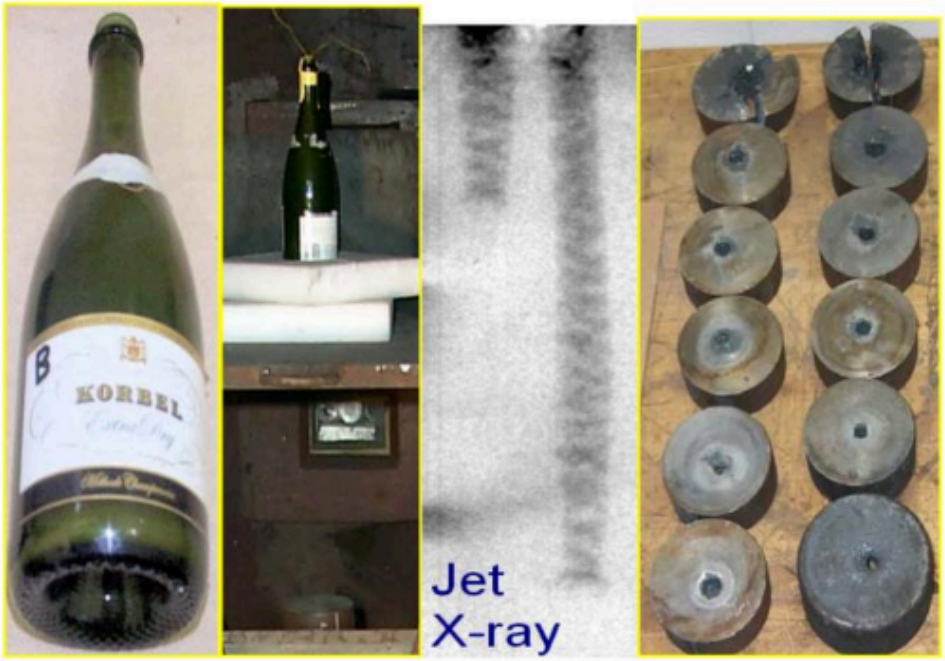


Figure 1. Explosively loaded beer bottle (left) and resulting steel penetration (right).



[87] "Improvised Shaped Charges", Desert Publications, https://dn710006.ca.archive.org/0/items/resistance_202309/ImprovisedShapedCharges_text.pdf
[88] "Ballistics 2011: 26th International Symposium", chapter "Improvised Shaped Charges" on page 341, Baker and co, 2011, https://books.google.se/books?hl=sv&lr=&id=L9oaDntTOvwC&oi=fnd&pg=PA340&dq=shaped+charge&ots=qUlPVkafZI&sig=UF2BKLagmtHJ0_4YyFIMlNNYdTU&redir_esc=y#v=onepage&q=shaped%20charge&f=false

Reference 88 states for this picture:
“The beer bottle shaped charge penetrated 2.6 CD (5.125” [13.02 cm]) of steel at a 6 CD (12” [30.48 cm]) standoff and 2.25 CDs (4.5” [11.43 cm]) at a 3 CD (6” [15.24 cm]) stand off…
The sparkling wine bottle shaped charge penetrated 3.4 CDs (11” [27.94 cm]) at a 5.5 CD (18” [45.72 cm]) standoff.”

Incendiary devices

These are devices that spread a burning accelerant.
The purpose of these is often to set fires, clear rooms/bunkers with fire and smoke, and be used against burnable targets or targets with exposed openings.

The classic and most easily prepared is the molotov cocktail:
The improvised throwable incendiary device.
All that is required is a glass flask, rag, liquid accelerant and lighter.
The device is prepared by first dousing the rag in the accelerant, and stuffing it halfway into the glass bottle filled with accelerant.
Then the rag is lit and the device thrown.
It causes two dangerous, first glass shrapnel, but more dangerously lit accelerant liquid splashing.

30-40% Liquor can also work, but higher concentration ethanol works better.
Lower concentration alcohol has too much water and cannot work properly.

I personally recommend trying different accelerants, liquor, distilled high concentration ethanol, hand sanitizer, gasoline/fuel, homemade napalm, acetone, etc (really any flammable liquid).

But when incorporating explosives one can create the spread of accelerants by explosion, rather than the throwing force and glass breaking.
For example you can prepare a container of explosives, with accelerant liquids in the walls of the container. And as it detonates the accelerant is spread.
And to help ensure the accelerant will burn, one can have dual fuses, one that goes to ignite the explosive, and one that ignites the accelerant prior to detonation..

But I generally recommend mixing fragmentation and incendiary properties. Because accelerant liquids can fit in between the fragments (like nails, bolts, etc).

Example:
Prepare a two layered pipe bomb.

Inner most layer with explosive, 8 second fuse.
Outer most layer with nails and handsanitizer, 4 second fuse.
Both fuses are taped and lit together.

This bomb would be lit and thrown, but you could also prepare a much larger device which is not thrown but has the same two layers and is meant to cause fragmentation and incendiary damage.

Another option is preparing a plastic bag (and/or aluminium foil) with explosives inside a bottle, then fill it with accelerants, dose a rag in the accelerant and stuff half of it inside the bottle.
This set up is meant to be lit and thrown like a regular molotov cocktail. Once it hits the ground the explosive experiences shock and the heat of the resulting fire.
It needs to be sensitive enough to detonate to this.
The result ideally is that it explodes almost immediately upon hitting the ground, and causes glass fragmentation and spread of the accelerant.

Rocket-propelled IEDS, Improvised Rocket Assisted Munitions or Improvised Rocket Assisted Mortars (IRAM)

Rockets function differently than explosives, and it is important to understand this.
Otherwise one might produce weak explosives or rocket-motors that explode.

With explosives you want high compression and confinement, you want full reaction quickly and pressure build up.
But with rocket fuel you don’t want this, not as much as least, because you don’t want it to explode.
So instead of trying to cause all of the explosive material to redox at once in a small space, the goal is to redox a small portion at a time, with some pressure.

The burning rocket fuel produces gas and generates force, you use a cylinder shape that’s narrow and hard, to direct the gas output in one direction and increase pressure.
The width/diameter of the cylinder dictates the portion which will redox/burn at a time.
So you want the cylinder wide enough so at least enough rocket fuel burns to generate enough force to move the object.

If you burn too much, while having confined the rocket fuel too much, then there's a risk of exploding it. Because then there’s high energy release that’s concentrated and other factors are confined like heat and pressure. It gets released all at once.

Now the goal is then to minimize the amount of fuel which needs to be burned in portion to move the object.
We want as narrow a diameter of the cylinder carrying the rocket fuel as possible. Because this means less fuel consumption to move the object, and thus also longer travel., more movement can be gained from the fuel.

So to help minimize the required force to move the object you want to:
1 Minimize weight.
2 Make it aerodynamic.

The second is quite simple and just involves keeping the top pointy/sharp and the body of the rocket small. This means less air resistance.

The “wings” in the back are meant to prevent the rocket from turning or spinning.

But the point of minimizing the weight is sometimes described as the biggest issue. Especially if there’s a payload as in an explosive head meant to be delivered.
The body of the rocket can be made of light material like cardboard or thin and light metals.
But the biggest component is the fuel, that is the heaviest part and one where you can save the most weight by using the best material as fuel.

Traditionally what has been used is light and low explosive material that are oxidizers. And then more easily burned fuels are added to help burn and balance the reaction.

Important pyro valences:
Glucose: +24
Fuel: +6
Aluminium: +3

Sodium nitrate: -5
Potassium nitrate: -5
Ammonium nitrate: -2

Sodium chlorate: -6
Potassium chlorate: -6

Sodium perchlorate: -8
Potassium perchlorate: -8
Ammonium perchlorate: -5

(Black powder can also be used as propellant, but pyro valence depends on your mixture)

Commonly in amateur circles a mixture called Rocket Candy (or R-Candy) has been used.
This is a mixture of a low explosive oxidizer with sugar.
Normally it is potassium nitrate and sugar. Because both can be bought in large amounts right off the shelf.
But the ammonium compounds, chlorates and perchlorates are actually a little stronger or more oxidizing.
So it is better to use ammonium nitrate, sodium perchlorate, potassium perchlorate or ammonium perchlorate.
The best being ammonium perchlorate, and balanced with aluminium, which is used in real modern rockets.

So simply use pyro valence to calculate the composition of oxidizer and fuel you intend to use.

Mixing these in powdered form works, but what is commonly done is:
Mixing the fuel (like sugar) and oxidizer (like potassium nitrate) in water, and then boiling the mixture until the water evaporates, but notice to keep the temperature well under 110℃, to avoid caramelizing the sugar.
The result is a finally mixed rocket fuel paste, which can be poured into the rocket and densely pressed and dried, and stuck to the walls of the rocket.

Now adding a rocket to a grenade would make this a rocket-propelled grenade (RPG).
And there are many variants, one could have a fragmenting and/or incendiary grenade, against infantry.
Or you add a rocket to a shaped charge, against tanks.
The idea is just that you can deliver an explosive round to the enemy from a distance by propelling it with a rocket.
All this type of ammunition needs to be launched is a metal cylinder to hold it, and so one can aim with it.
And a button to light the rocket fuel or booster propellants.

Fully assembled the weapon would look like this. The rear hole is open, because the rocket fuel is capable of moving the charge to the target alone, and needs only be ignited.
This has led to these weapons being described as "recoilless", because the forces go forward and backwards with equal momentum.

And this is different from another design where you want the back sealed with a temporary button, to help build up pressure. Usually for a single explosive propellant charge.
Like the old panzerfaust:

The Panzerfaust and bazooka-like Panzerschreck proved effective at knocking out Allied armor in urban combat.
Holes in the foldable sight—which also served as a safety—were calibrated to distances from 100 to nearly 500 feet.
Firing lever
Black powder propellant
Fuze and booster
Hollow charge cone
Shaped explosive charge
Spring steel stabilizing fins extended upon leaving the tube.

This has only one round black powder propellant which is instantly ignited, unlike the slow portioned fire of rocket fuel in rocket propelling functions.
And the back is sealed, to help build up gas pressure to launch the charge.
But this design is more like a mortar than a rocket. And should be tight without unnecessary airgaps.
It explodes once and shoots a round which slowly falls towards the ground.

I only mention this because this is another option one could try instead of a regular RPG design (where the charge is launched perpetually with rocket fuel).
And because this design is relevant to understanding how mortars work.

So ultimately:

Rockets are not hard to build and can be used to deliver a charge.

RPGs are explosive charges with rocket fuel compartments, and the rocket fuel burns strongly enough to carry the charge the entire distance.
And it is normally fired by an open cylinder.

But one could also make a semi-hand held mortar round, that fires one round of propellant meant to generate all the force needed instantaneously.
And it is normally fired by a closed cylinder, which is tight and has almost no airgaps.

Lastly: A common warning for all weapons using rocket or explosive propulsion functions, the rear openings can and will shoot high pressured fire and gas output that can damage what's behind it.
It is standard military training to check the area behind you before firing.
Make sure there's nothing close behind you when firing, no person, no tree, no wall, and if you are laying down then make sure your legs are not behind the weapon (lay them to the side).

Long Distance Weapons

Mortar/Artillery

These are weapons which deliver fragmentation rounds over a longer distance.
The function is similar to that of the gas and rocket propelled weaponry in "Devices". But these weapons use larger propellant charges and are intended for longer distances. This also means a more robust metal cylinder is needed that can withstand the explosive.

There's mortars and regular field artillery, sometimes called howitzer, which are large cannons with one round gas propelling explosive for each charge. Like the panzerfaust mentioned in "Devices".
The importance here is that the cylinder rear is closed, and the round is tightly fitted into the cylinder, to minimize air gaps.

The last variant is “rocket artillery”, this is like the RPG described in “Devices”. It is artillery rounds with rocket motors that carry them. And these are fired out of normal open cylinders.
Notice though that there’s a slight difference in the idea.
The RPG weapon uses rocket motors that carry the round all the way and straight towards the target.
And the RPG is fired so closely to the target that this works.
But the rocket artillery weapon is meant for long distances and is thus fired at an angle, and so the rounds use rocket motors for half the distance.
Basically rocket artillery rounds use rocket motors and firing angles to fire forward and up in the air, and then the gravitation and momentum carries it the final distance.

So because mortars, field artillery and rocket artillery all utilize firing angles, trajectories, and gravitation for the last half of the trajectory.
We need to calculate the estimated distance.
With hand held weaponry like RPGs and gas propelled charges, fired at close distance at straight towards the enemy, there’s no need to estimate the trajectory other than with intuition. And one can make adjustments based on their direct observations.
But with artillery and mortars, you have a much harder trajectory to estimate, and don’t see first hand observations to make adjustments.

Therefore there are two methods to fire at the correct direction and angle.
1 Theoretical calculations and estimation of trajectory.
2 Reported information and corrections.

1 Is the initial method used, to get the charges roughly where the enemy is, and the artillery weapons being indirect fire (damaging areas) can likely hit the target.
2 This is the information being fed by frontline soldiers. If the artillery hit, that can be reported, and if it missed they can report how many meters it missed by and at what direction.

For very small or pin point accurate targets, precision is needed and achieved primarily by frontline soldier reporting.
And this is done by a process of test shooting.
The process is usually that the artillery fires one round at a time, and the frontline reports and gives small corrections each time, and at around the 3rd shot the artillery will start hitting the target.
At this point once the artillery starts hitting the target, that is reported so it continues, and launches a barrage if that is the idea.

This can be coupled with many artillery pieces. For example:
Artillery 1 (fires a shell), front reports corrections, while artillery 1 is loading artillery 2 fires, front reports corrections, while artillery 2 is loading artillery 1 fires, etc.
Once an artillery gets confirmation of a hit, then it either gets the command to barrage (fire uninterrupted) or awaits the other artillery to find the target.

The reason you would do this is because you can more quickly find the target. You save time on reloading by having two or more artillery pieces firing interchangeably.
It also allows you to correct two or more guns at the same time.

But there are also situations that require less or no corrections. For example if the enemy performs a massive charge with many troops and/or attacks through small corridors. In these situations the goal is just to bomb the area.
A good preparation is to have test fired the artillery and have it directed to the important area. So once the enemy performs a push, the artillery is already ready to barrage.

To accurately fire the gun one needs:
1 Direction. Point the gun in the right direction.
2 Angle. Point the gun upwards at the right angle.

The direction is always easy to determine with a compass. And using maps allow you to communicate direction and estimate distance to fire.
So when an artillery unit receives the place to fire against. They use a compass to determine the direction and can immediately start correcting the direction on the gun.

Now artillery pieces usually already have engraved tables showing the distances at different angles, and a grid showing the current angle of the gun.
But if for whatever reason you haven't calculated the distances at different angles, then you can also pretty quickly do so in the fields.
When the gun is being turned for direction, one can calculate the angle also.

Two things are needed to calculate the angle:
1 Velocity of the round. The speed it travels.
2 The distance you are going for.

The quick and easy formula for the relation between distance, speed and angle is:
$R = V^2 * \sin(2 * a) / g$

R = Distance
V = Velocity
a = Angle
g = gravitational force (usually 9.81 m/s^2)

Now sin(90) = 1, so you can see that when a = 45, you get the maximum distance based on the angle.
So for maximum distance you want the angle 45 degrees.

To estimate/calculate the velocity of the round, you can test fire the mortar/artillery, and then you use the angle and resulting distance to calculate an estimated velocity.

When you know an estimated distance for the mortar/artillery, then all you need is the approximate distance you will fire over, and you can calculate the angle.

If the distance is too far, then it will result in an arcsin of a number larger than 1.
$R = V^2 * \sin(2 * a) / g$
(=)
sin(2*a) = R * g / V^2

If: R*g / V^2 is greater than 1. Then the distance is too far.
I suggest testing firing at 45 degrees angle and getting a report if it landed or not.
If it did not land, then you report it is too far.
But of course always make sure in these kinds of test firings there's no chance it hits your own troops.

Summary:
When you have built a mortar/artillery system. Test fire it at different angles (useful intervals like 45 degrees +- 5 for every interval).
You then measure the different distances. And make a table with distance at different angles.
And then with a distance and a corresponding angle, you can calculate the velocity. Since you have many sets of distance with angle, you can make many estimations of the velocity and get the average.
The formula is: $R = V^2 * \sin(2 * a) / g$
R = Distance
V = Velocity
a = Angle
g = gravitational force (usually 9.81 m/s^2)

V = sqrt(R * g / sin(2 * a))

In the field you will be reported with places to strike. Using a map and compass you can immediately start setting the direction.
If the distance has already a determined angle from a table or chart, then just use that.
Or you quickly calculate it with the formula:
a = arcsin(R * g / V^2) / 2

R being the distance you need to fire over. And V is the estimated velocity for the gun. And g is 9.81.
Again if R*g / V^2 is clearly above 1, then report that it likely won't reach.
You may also know by test firing at the angle of 45 degrees, which will have the maximum range.

And in the field you use calculations for estimated fire. But then you listen to the reports from the frontline, to make precision corrections.

The frontline reports a horizontal and vertical correction (the perspective is above looking down).
Examples:

(if shooting 50m to the right and 20m short, the frontline reports:)
50m left, 20m forward/up
(or if shooting 30m to the left and 30m too far, the frontline reports:)
30 meters right, 30 meters back/down

The artillery team will receive this, and can easily implement the corrections.
The horizontal corrections are done using the map and compass. If they report 50m left then assume a target 50m to the left on the map, and measure the new direction with the compass.
The vertical corrections are done using the formula. If they report 20 meters forward/up, then increase the needed distance (R) in the formula with 20, and calculate the new angle.

Basically:
Horizontal corrections move the target on the map left or right, and a new direction is taken with the compass.
Vertical corrections increase or decrease the needed distance, R, in the formula. And a new angle is calculated.

When the artillery is straight behind the frontline then the rights and lefts line up. But the above mentioned system works even if the artillery is placed to the left or right compared to the perspective of the front line.
The artillery team marks the corrected target on the map in relation to where the frontline it, and adjusts their fire based on the map.
For example if the frontline: reports 50m to the right and 30m down. The artillery team marks the new target on the map, 50m to the right and 30m up in relation to the old target, correcting for where the frontline is placed.
And then the artillery team measures the new horizontal direction from where the artillery is, with the compass.
And then the distance can be measured using the map and ruler, or using pythagoras theorem to account for the angle difference in the vertical correction, or whatever else geometry you want to use.
For example: 50m right, 30m up.
The new target is placed on the map, and with a compass they measure the new direction.
Then measure the distance with a ruler.

The frontline reports where the artillery team shall aim, what type of fire is asked for, and corrections. If the enemy moves, that can also be reported as a correction (the enemy moves 50m to the left, and the front reports 50m to the left).
The artillery team reports the ammunition left so that the frontline knows how much is available. And when they possibly receive more ammunition.

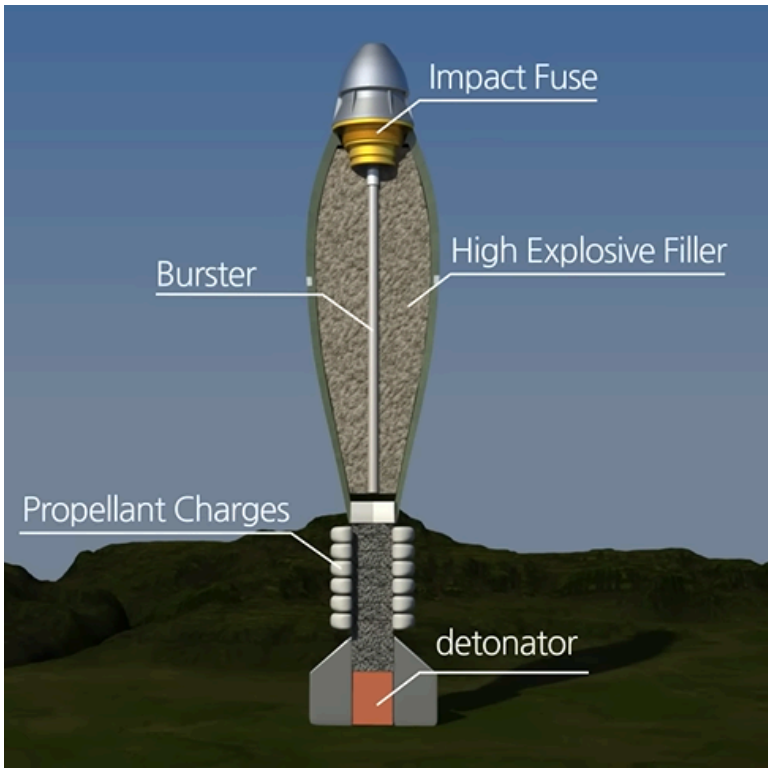
And there are different types of fire the artillery team can perform:
Corrective fire: Single shots with corrections reported to fire at specific places.

Barrage fire: Many uninterrupted shots at a short time, to kill the enemy.
Suppressive fire: Few evenly dispersed shots over an interval of time, to suppress enemy movement.

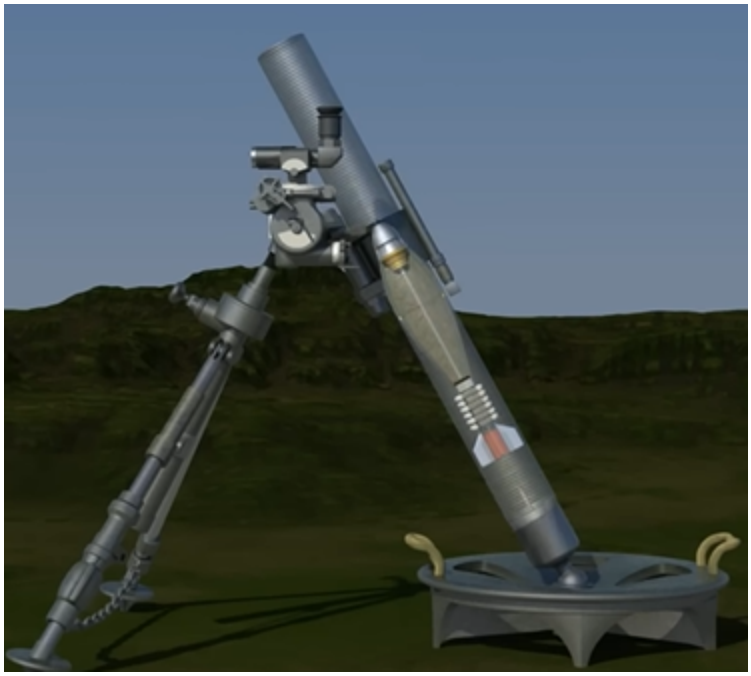
I'll note, all you really need to direct fire is basic geometry knowledge, map and compass, the relation between velocity, angle and distance. And soldiers on the front to report corrections.

How reports are said, what geometry system you use, doesn't really matter, just that everyone understands the system and can quickly determine the changes needed to be made.

Mortar



A typical mortar round.



The mortar round is placed at the opening, and once you let go of it, it falls into the barrel.
At the bottom waits a spike or hammer pin, which will detonate the propellant charge.
The propellant is often gunpowder, or smokeless powder. Basically a low explosive which generates a lot of gas. So most explosives would work but they should ideally not be too powerful risking damaging the equipment.
So the mortar propellant charge should use a low explosive (with low detonation velocity), but the fragmentation charge should use a high explosive (with high detonation velocity), because that charge is carried and should be powerful to reduce the weight needed.

The mortar design is quite simple in theory. But to improvise this requires trial by error, because there are so many factors that affect whether the round successfully launches or not.

The barrel needs to be of thick metal to handle the propulsion explosions and just wide enough for the round to fit. Very small airgaps are present if the round can successfully slide down, but these should be as small as possible.

Then there's the tripod legs for stability. And the round base, which is often dug into the ground and keeps the mortar stable when firing. So it doesn't move.

A mortar team usually consists of 3 people, it can be operated by one person. But three is better because it divides the work and makes the mortar more quick to operate.
One person carries the barrel. The second person carries the base. The third person carries the tripod legs. And the ammunition is carried in boxes with handles.

But of course using more people works also.

Field Artillery

The field artillery utilizes the exact same physics as the mortar.
The difference being that the artillery round isn't loaded at the top, but placed in a hatch, and then a safety pin is pulled, releasing the firing pin.
One could of course design field artillery which is loaded like mortar systems, but normally these function like a rifle. The round is loaded, the propellant is loaded, and then the firing pin is used.

Another factor is that these fire larger rounds, and so one needs a thicker longer metal barrel, and more supportive legs.

The IRA made an improvised variant of a mortar/artillery system called "Barrack Buster":

Rocket Artillery

This is rocket artillery mounted on a vehicle, to make it mobile.

Usually these are systems of many open metal barrels carrying rocket propelled charges.
If one can design light fragmentation charges with rocket motors capable of propelling them then this is an easy to improvise weapon because the rest is just for stability and holding the rockets. And to adjust direction and angle.

The calculations and corrections all work out the same for this weapon, even though it has propulsion half of the way.
You still calculate and estimate a velocity on the charges by using the resulting distance for the angle used.
And that velocity can later be used with distance to calculate needed angle, or with an angle to calculate distance.

So in a way this might be the better option to try and improvise, the hardest part is making the rocket bombs. The rest is simple.
But when building mortar/artillery systems. You need to build the gas-propelled bomb, and then build a system which can properly fire it without exploding or providing too little pressure to send the bomb.

Vehicle mount/Self Propelled

Almost any weapon can be mounted on a vehicle. And it is a great advantage to do so. Using vehicles is a must in modern warfare whether a formal army or terrorist organisation.

Vehicles can regularly load the equipment and transport it, or it can be mounted and ready to be used at an instance.

But both offer great mobility, making it possible to position resources most appropriately. You can suddenly defend a much larger territory and more quickly strike the enemy. It also saves on physical power to carry or assemble the gun. And it makes disengaging easier.

In the advent of cars and trucks, it became possible to transport the parts of an artillery piece, thus more quickly deploy or move the weapon.
It is the bare minimum that should be coupled with an operation of making long distance weapons, is the ability to transport them and make them mobile.

Long distance weaponry is usually heavy but can also be mounted on vehicles, this is often called “self propelled”. This saves the time of having to assemble the artillery piece.

Beside this vehicles are used to transport everything in modern warfare logistics, food, water, wood for fire, soldiers, equipment, etc, everything can be more quickly performed using vehicles.

In fact it is common in the Ukraine-Russia conflict that special forces use civilian type cars to quickly move to and from the front if they are in small teams.

So any serious paramilitary organizations want to seize vehicles. Any and all vehicles.
All that can be used for transport or mounting weapons, and even those which can't be used, because those can be scrapped for valuable material and reserve parts.
Material like, fuel, steel for fortifications, acid-explosive liquids, airbag explosives, etc.
Reserve parts like, tires, car batteries, motors, lights, really any part still functioning.

This of course applies to all vehicles: tractors, bulldozers, trucks, vans, motor cycles, mopeds, boats, etc.
Anything that can be stolen should be.
Some parts may not even have practical value but they have monetary value. Stealing boat engines is a perfect example, they have great value on the market and should be stolen also.

Lastly I'll add that some of the more heavy machinery can be "armored" like an improvised tank. And having small slots and openings allow weaponry to shoot out of it.
The famous example is the killdozer, an improvised tank of a bulldozer.
The police weaponry could not stop it and blockading methods did not work either. The driver's rampage continued uninterrupted until he got stuck and decided to commit suicide.

This was created by simply preparing layers of steel and concrete around the bulldozer. About a foot thick.
And using an air conditioning system.
Small holes for the weaponry and cameras.

When you consider how accessible and realistic it is to build such an improvised tank, and the incredible damage it did destroying the town hall, mayor's house, police department, and many businesses, completely unbothered by police.
You realize how powerful this could be to incorporate into a battle as a terrorist. They would quite literally need to use modern military anti-tank weaponry to penetrate it and kill you.

But it should be noted some disadvantages:

This is far from a fast modern tank and is naturally very slow especially with the weight.
It consumes a lot of fuel, depending on the size and load, it is somewhere around 20-45 liters per hour.
It also lasts on one fuel tank around 8-20 hours, depending on size and load.

So this tank is slow, lasts half a day, and consumes a lot of fuel. It is clear that its limitations make it mostly suited for urban warfare.
It needs a compact battle ground like an urban area where it doesn't need to travel long distances. And it has close to possible supply depots with fuel, like some building friendly troops took and stored supplies in.

Drones

This is the highlight for the chapter of "long distance weapons". The advent of drones have allowed long distance reconnaissance and precision bombing with very little material and at a very effective level.

Any paramilitary or terrorist organization can easily incorporate these tactics and do devastating damage.
It's only a time question before we start seeing drones crashing into crowds with bombs strapped on them.
And naturally there will be immense restrictions and countermeasures.

I highly recommend that one tries to monopolize on drones immediately.
Buy them, buy the parts, buy 3D printers, 3D print parts, steal them, find improvisable variants using common materials.
Any group should stock up on drone material immediately.
And they should stock up on machines, tools, 3D printers, anything that can be, used to make drones.

And notice that all of these drones have cameras on them for first person view (FPV).
And the operator wears VR-headsets.

Types

Radio controlled

Radio controlled is the common drones used in civilian life. And these were used in the beginning in the Ukraine-Russia conflict.
But the Russians quickly realized there was a slight problem in relying on radio signals.
Firstly, the signals can be traced and thus when returning from a reconnaissance mission can provide information of the drone team's location.
Secondly, the signals can be jammed. There isn’t such a device yet that effectively jams an incoming radio operated drone, but could in theory become an issue later.
Thirdly, there’s also devices that detect the radio signals from a drone and send warning signals. Which are common.
Which led to the use of a different type of drone.

Fiber Optic Cable

The fiber optic cable controlled drones. These are drones connected by a long cable to the controller, and use light signals to communicate between the drone and controller.

These avoid the disadvantages before mentioned. They don't send traceable radio signals, they cannot be jammed or detected.

And this type has become very common now in the conflict.

But I would point out that for terrorist purposes the radio controlled drone is better fitting. It has no risk of a cable getting stuck somewhere. And the police have no tracing devices or similar ready like soldiers on the front might have.

Only if the police were to find a counter measure for radio controlled drones, it is good to know about the fiber optic cable variant.

Roles

Recon

One huge aspect of the usage of drones is the reconnaissance. These provide the ability to scan areas, and at crucial times like before a push or when defending.
Because these are up in the are longer times, and return to the sender, these are more reasonably fiber optic cable variants. Though radio controlled also works.

Recon can be used to help provide information for so many operations. For example to observe artillery fire on enemy targets and report corrections.
That is why the drone operator is often close to the radio operator in contact with the artillery center (that processes the reports and sends them to the artillery teams).

Kamikaze

These are drones strapped with bombs and detonate upon impact. Most importantly keep the weight evenly balanced, while these charges tips are the most forward.
These naturally sacrifice the drone itself, because it is easier to land the strike.
With first person view and crashing into to the target makes hitting the target very easy, especially if it is a moving target.

To surprise enemies they have started using tactics like: leaving these at important roads. And once the enemy drives past then these are activated very close to the vehicle and will attempt to land a strike.
Most effective is starting just before the vehicle is about to pass, and simply flying the drone in front of the car which likely doesn't have to time to react and evade.

Bomber

These are drones with time-delayed explosives and drop them onto the target. Commonly hand grenades have been used, and it simply has a mechanism to remove the safety pin and drop the grenade.

The advantage being that the drone is preserved and you can load many grenades on it and drop many charges on the enemy.

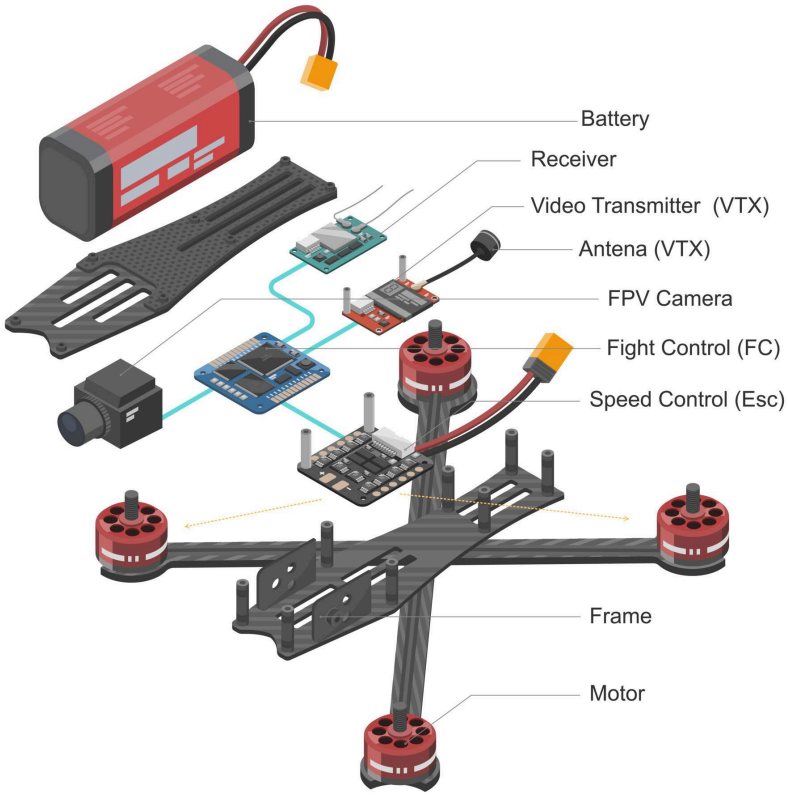
Notice however this is not fitting against vehicle targets. Rather it is meant for infantry in fixed positions, like in trenches or similar.

Preperations

Before continuing, notice that it is simple to buy complete drone sets with VR-headsets. But these have restrictions on them to avoid flying at certain heights or at certain places.
But these restrictions can be removed by different tricks, like reprogramming or jailbreaking iphones/apps, etc. Which is discussed further.

The only real problem with store bought FPV drones is that they might be traceable, even when exploded with a bomb.
If possible I suggest learning the skill of making FPV drones. Because it means they are less traceable and if the worst would occur, like a failed kamikaze strike, the explosive didn't trigger, and the police captured the drone, well at least there wouldn't be model/serial number and could be matched to a purchase.

Assembly



This is a general FPV drone schematics.
How to build drones, program drones, etc, is all so publicly available that I won't waste time describing that in a simplistic fashion.

What you should know is the general structure of it and the parts you need. If you are going to build one yourself, otherwise you just buy a complete one.

The frame itself and binding material can be 3D printed.
Otherwise just use zip ties to keep things in place.

Jailbreaking

Drones that are bought have restricted programming. That is why you either make and program your own drone, or you jailbreak a bought drone.

There’s probably a million ways to jailbreak a store bought drone to remove any restrictions. But one method I found is:

1 Buy a FPV drone that is connected to your iphone via an app.

2 Jailbreak your iphone with your computer. Programs like “checkra1n” and “unc0ver” offer jailbreaking power.
And they allow you to download apps like “cydia”.

3 Download cydia, cydia allows you to download many apps not listed in the appstore and modified variants of apps.

4 Download the app for the drone, but a modified variant without restrictions. Thus now you have an unrestricted drone.

Another method is using software packages like these that can change the programming for a drone:
https://www.drone-hacks.com/

Disguise

This is my last idea for weaponizing drones and that is to disguise them as birds. Honestly, I'm surprised it hasn’t been tried before.
Because a fiber optic drone which is disguised as a bird flying at high altitude, could be the perfect recon weapon.

It doesn’t permit traceable and detectable radio signals. At high altitudes it makes no sound and must look very much like a bird.
It would definitely not cause alarm for the enemy and make them consider switching positions.

Or it is used as a kamikaze or bomber drone. And it gives more time to get closer to the enemy before they realize that it is not a bird.

I also think this could be highly effective in terrorist settings to strike against state events or public demonstrations/protests.
The police present won’t suspect a bird flying above the crowd. And in fact the drone could likely be very close to the crowd because of all the noise from the crowd.
The drone's sound from its motors will be suppressed from the crowd.

So a safer way to fly the drone into position and prepare to strike a target with the police present watching, could be to disguise the drone as a bird.

Toxicants

This chapter will cover both poisons used to kill but also psychoactive drugs meant to sedate.
That said some could fall into both categories, meaning they could knock someone unconscious or kill them easily.
But then I'll describe that in further detail at the relevant substance.

So when I use the word toxicant I'm generally referring to toxic substances that harm, sedate or kill.
And I will divide the substances into 3 main subcategories; artificial poisons, organic poisons and intoxicants.

These are not perfectly defined and also reflect how one comes about them.
"Artificial poisons" are either found in synthetic products or prepared in a lab setting.
"Organic poisons" are naturally occurring in animals or plants, and sometimes found in products.
"Intoxicants" are sedatives.

But it should be stated that almost everything can in theory kill a person if one consumes enough of it.
And could be called a "toxicant", but instead the term refers to substances with high toxicity meaning they are actually effective at killing.

Toxicity and Dosage

Poisons kill in different manners and can be noticed in autopsies in different ways.
This is a factor which needs to be considered when picking poison and how it is administered. If one wants to create a scene, and make it look natural or an accident.
I will provide some natural ideas on certain poisons, but for more general ideas on how to make a homicide look natural or like an accident than read the chapter on assassination.

So depending what kind of homicide you want to commit and if you want to obscure the event for authorities, I suggest checking the actual killing factor of the poison, how it damages or disrupts the body.

It is hard to give a poison which will not turn up on an autopsy.
There are different standard things which are almost always checked; exterior wounds/cuts, x-ray of organs, blood tests checking for common street drugs (alcohol, cannabis, cocaine, etc).
But they will test for specific possible poisons depending on the evidence from witnesses and the crime scene.
Sometimes depending on the account of how the person died, like whether they had a hard time breathing or couldn't move or talk, that will help them determine what set of possible poisons caused the death.

And it should be noted when a young person dies unexpectedly that they are going to be extremely skeptical to conclude it was natural.
They are always going to look for a clear non-natural cause of death. Meaning it is hard to make it look like a young person died naturally.

That is why if you are going to poison someone there's a few general strategies:
1 "Aggressive method", which is administering the poison secretly or not, irrespective of whether it is found or not.
This method works best if you target a person not tied to yourself. The idea is to maximize/prioritize the likelihood of successfully giving the poison and the poison killing the target. And this is done at the cost of doing so secretly because when you have no ties with the target, you naturally have a low chance of being caught anyways.
An example would be using a poison easily absorbed into the body and very lethal, but easily found in an autopsy. This is very good because when they find it, it gives little clue as to who you are to the victim.

The "Julie Jensen case" would be an example of this. The murderer gave his wife anti-freeze (ethylene glycol) in wine or with medication, and because of its sweet taste went unnoticed. And he kept doing this until she eventually died. But didn't consider the effect that ethylene glycol crystallizes the liver.
So naturally the autopsy eventually noticed the crystals of the liver clearly indicating poison.
And since he was so close to the victim he was immediately a suspect, after the investigation they had found a lot of evidence in his work computer and eventually the murderer was proven guilty in a trial.

2 "Obscured method", which is giving a poison often not checked for, preferably in a set of circumstances where death isn't unexpected.
This method works best against alcoholics, drug abusers, elderly, etc. And can be used against young targets and targets you know personally.
But it is important to avoid leaving traces, evidence, or any material. Have a clean search history (recommended to buy a new phone, and use the old one for research and hide it well).

A famous case of this is the "Kurczewski case", where visine eye drops were used to poison an elderly woman abusing prescription pills and alcohol. Initially the cause of death couldn't be determined before the murderer was pressured to admission in an interrogation.

3 "Overdose method", which is giving a substance the victim uses and giving them an overdose of the substance.
This method is generally one of the better and best to use against a target one knows personally, and/or a young target, if one wants to make it not appear as homicide.
Because two very likely possibilities can explain the victim's death, intentional overdosing (suicide) or unintentional overdosing (accident).
For example a person can die due to insulin poisoning, so if one knows a target who is diabetic and uses insulin. One can easily give them an insulin overdose, and leave no evidence on the crime scene. To make it almost impossible for the police to conclude anything but suicide or accident as manner of death.

4 “Accident method”, which is giving a poison not regularly checked for, and creating a set of circumstances where death seems accidental.
Also one of the better methods and is built upon the CIA manual for assassination discussed in the chapter on assassinations.
Here’s two examples, either; give a poison and then toss the victim outside a window in a tall building, or give them a sedative and then toss them.

In either case, the poison or sedative can be unexpected and make them unable to resist, and tossing them outside the window will make it look like a suicide or accident.
And will give very little reason to check for uncommon poisons on the autopsy. Though they will likely check for alcohol and other drugs, so giving the poison or sedative in alcohol can help form the idea the victim was drunk, and drunkenly comited suicide or fell accidentaly.
Just make sure the building is tall enough for it to make sense that they would die. Like a hotel room high up or similar place.

To calculate how much poison you need to poison a victim you use different “lethal dose” estimates.
A normal recorded number is the “median lethal dose” abbreviated as LD_{50}. This is the amount of poison per amount of body weight which 50% of the time results in death.
And so this would be the bottom amount you would not use. You would wanna use more to have an expected death.

But there are different estimates for different likelihoods of death and for different dimensions:
LD_{75} would be the weight of poison per weight of body, that 75% of the times results in death.
LC_{50} is the concentration of an environment, that 50% of the time results in death.

LC numbers are only relevant for something like chemical warfare, trying to estimate the amount of poisonous gas needed to produce a certain concentration in the environment, for it to be deadly.
And so this won’t be very relevant for this chapter, because this chapter discusses mostly poisons which need to be administered to the victim, and not poisonous gases

Using LD simply involves multiplying the number with the body weight of the victim. Giving the lethal dose with the estimated likelihood of death.
Naturally you want to use LD_{99} and excess poison to make it certain that it will kill the victim.
The LD helps give the ballpark of what amount to use because some poisons require grams while others require mikrograms.

Example of a calculation:

LD_{50} for botulinum toxin: 1 mikrogram/kg (when consumed by mouth).
The target weighs approximately 80kg.
1*80 = 80
So for a 50% chance of killing the victim you need approximately 80 mikrograms.

And using an excess is good to ensure death, so using for example double the higher estimate would likely have a much higher chance of killing the victim without using unnecessarily much.

So for a ca 80kg target, using 160 mikrograms botulinum toxin will likely kill the victim.

But of course using even larger excess is fine.

Excesses should always be used with a large margin. As a safety margin.

Artificial Poisons

Arsenic trioxide

As_2O_3

LD_{50} 1.5-4 mg/kg (oral consumption)

Slightly sweet tasting white powder.

Arsenic compounds are generally poisonous.
Some of these were used in pesticides, but all have been out-phased and are very regulated if not completely banned. And so you likely can't find or use most of these, but if you have access to old pesticides you want to look for:
Lead arsenate
Calcium arsenate
Sodium arsenite
Sodium arsenate
Copper acetoarsenite.

Otherwise one of the most toxic compounds that can be prepared in a lab is arsenic trioxide.
This involves heating arsenic ores and generating arsenic trioxide gas, which is then cooled and condensed into a solid state.
So to state the obvious: you MUST use air tight equipment, fume hood, and good ventilation. I recommend using a gas mask.
These gases will kill you.

The minerals you can use are:

Orpiment (As_2S_3), heated to 500-600℃, generates As_2O_3 vapors.

Realgar (As_4S_4), heated to 500-600℃, generates As_2O_3 vapors

Arsenopyrite (FeAsS), heated to 600-700℃, generates As_2O_3 vapors

The vapors are passed to the container which will capture the poison. And the poison will quickly form. Because As_2O_3 sublimes at 615℃. Meaning the room temperature will cool the poison sufficiently and it will immediately form a salt in the container. Without first becoming a liquid.

These minerals can be purchased online.

Lead acetate

$Pb(CH_3COO)_2$

LD_{50} 500 mg/kg (oral consumption)

Also called “sugar of lead” for its sweet taste. It is a water soluble white crystal.

Lead compounds can be heated to decompose into lead oxide, and then lead oxide can react with acetic acid to prepare lead acetate.

Lead carbonate and lead oxide both react with acetic acid to make lead acetate.

I recommend using lead sulfate. I’ve described the thermal decomposition in “Sulfuric Acid” on point “5 Lead Sulfate Method”.
Basically heating lead sulfate to 1000℃ generates lead oxide and sulfur trioxide.
The sulfur trioxide can be passed into water and makes the useful sulfuric acid.
And the lead oxide can react with acetic acid to make lead acetate.

Lead sulfate is found in lead-acid batteries, like car batteries.
I recommend checking old ones, likely sulfonated for lead sulfate.
Again, check car batteries for the liquid battery acid, which is 30% sulfuric acid, and check for lead sulfate, which are white crystals/powder usually gathering at the anodes.

Ethylene Glycol

$C_2H_6O_2$

LD_{50} 1.4-1.6 g/kg (oral consumption)

It is a sweet tasting colorless liquid.

Ethylene glycol is found in anti-freeze (usually 50/50 EG and water). And the water can be boiled off to purify the product.

Tetrahydrozoline

Sometimes called tetryzoline.

$C_{13}H_{16}N_2$

LD_{50} 2 g/kg (estimate for oral consumption)

Odorless, colorless, tasteless liquid.

Commonly used in eye drops. A typical brand carrying tetrahydrozoline is Visine.

Typical 0.05% eye drop: 0.5 mg/mL

- 5 mL ingested → 2.5 mg tetrahydrozoline
- Some adult cases of significant cardiovascular compromise occurred at **2–10 mg orally.**

Basically the estimate of millieliters of (tetrahydrozoline) eye drops is:
Body weight in kg * 4 = ml (eye drops for expected death).

Tetrahydrozoline can also be found in nasal sprays.

Causes dizziness and unconsciousness, can therefore be used for rendering someone unconscious. Has also been used in sexual crimes, because of its capability for worsening someone's awareness and judgment, causing someone to sleep and memory loss.

30-45 ml causes dizziness and possibly even abdominal pain.
120 ml can put a person to sleep.

The liquid is also very poisonous and can effectively cause death when ingested.

6 bottles of Visine is lethal.

One can effectively and stealthy kill a target with 6 bottles of Visine, by adding the liquid to a drink.
The advantage of this method is that eye drops are a liquid that are colorless, and without any great smell or taste. It can therefore be mixed in water or other drinks, and drunk without notice.

Insulin

LD_{50} 0.02 mg/kg or 0.02 ml/kg (injected)

Notice that insulin is non-lethal when orally consumed. But can be very toxic when injected.

Insulin lowers the blood sugar.

As the blood sugar drops less than 50 and then less than 40 mg/dL, more severe symptoms can occur, including: Pronounced confusion Lethargy and loss of consciousness Seizures
Coma

A glucose less than 40 is considered a very dangerous level that requires immediate attention.
Often, when a patient has a glucose this low, they are not as alert as they would normally be, and sometimes they are passed out.

Insulin can be bought over the counter. An example is the so-called “walmart insulin”. Walmart for example sells two different types of insulin prescription free.
It’s usually cheaper than regular insulin, and more hard managed, as it often causes low levels of blood sugar (because of the rigid diet required).
This is probably the best way to go to poison someone with insulin. buy it over the counter with cash. and administer an overdose, get them below 40 mg/dl blood sugar

Sodium Cyanide

NaCN

LD_{50} 3-6 mg/kg (oral)

White crystals, smells and tastes like bitter almonds.

Procedure:[89]

NaOH (or KOH)

Urea
$CO(NH_2)_2$

Carbon
C

Mix thoroughly, use a blender, put in a metal container outside and burn with flame, open lid, reach 600C. (lid on, but not closed)

Use extra carbon, and at the end add sodium bicarbonate, this neutralizes and removes hard to remove by-product or unreacted material. DO NOT ADD ANY ACIDS to the solution with the end product. In fact there’s no acids involved in this reaction at all. Because the alkali cyanide will generate hydrogen cyanide gas.

Important when burning do this outside, the fumes are dangerous, natural wind is good, and keep away from it.

When extracting the cyanide, use gloves and full body covering, don't scratch your face, pick your nose or touch your eyes like a retard.
Important before handling/extracting, put everything in a big plastic container, in case you spill, and only then start working.
Always think what if the worst thing happen, what if I spill, what if I spill on my wrist or table, what if the fumes will blow towards me (don't be in the same place), etc

Mix everything, outside heat 600C, add to methanol, add sodium bicarbonate, filter, evaporate/distill methanol, left is sodium cyanide (or potassium cyanide).

Potassium Cyanide

KCN

LD_{50} 3-6 mg/kg (oral)

White crystals, smells and tastes like bitter almonds.

Procedure:[89]
NaOH (or KOH)

Urea
CO(NH2)2

Carbon
C

Mix thoroughly, use a blender, put in a metal container outside and burn with flame, open lid, reach 600C. (lid on, but not closed)

Use extra carbon, and at the end add sodium bicarbonate, this neutralizes and removes hard to remove by-product or unreacted material. DO NOT ADD ANY ACIDS to the solution with the end product. In fact there's no acids involved in this reaction at all. Because the alkali cyanide will generate hydrogen cyanide gas.

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When extracting the cyanide, use gloves and full body covering, don't scratch your face, pick your nose or touch your eyes like a retard.

[89] "Preparing Potassium Cyanide - DO NOT ATTEMPT", The Canadian Chemist, 11 Dec 2023, https://www.youtube.com/watch?v=UdoUQkzFvSg

Important before handling/extracting, put everything in a big plastic container, in case you spill, and only then start working.
Always think what if the worst thing happen, what if I spill, what if I spill on my wrist or table, what if the fumes will blow towards me (don't be in the same place), etc

Mix everything, outside heat 600C, add to methanol, add sodium bicarbonate, filter, evaporate/distill methanol, left is sodium cyanide (or potassium cyanide).

Organic Poisons

Saxitoxin

LD_{50} 0.02 mg/kg (oral)

Saxitoxin is a poison that forms in shellfish. And most aggressively in mussels and clams.
Commercial and restaurant mussels, oysters, clams, lobsters, crabs, etc are usually safe to eat because these species are monitored to avoid the formation of this poison.

But one can fish for shellfish illegally in unregulated waters. These are much more likely to have saxitoxin.
Especially during algal blooms ("red tides"). Red, brown or discolored water can indicate a bloom that produces saxitoxin.

The poison is located in the viscera of the shellfish. Meaning inner organs or intestine.

To extract it you simply add the viscera to a water and acetic acid solution (like vinegar). And blend/dissolve the viscera.
And then filter the solids from the solution.

The solution is a water-acid-saxitoxin and potentially lethal liquid.

To increase the concentration of saxitoxin, simply add more viscera and extract more and more of it, and keep filtering off the solids.

Amatoxin

LD_{50} 0.1 mg/kg (oral)

Amatoxin is a poison that is common in different mushroom species. The idea is that you will check the following list of species, and check if they grow locally:

1 Death Cap / Amanita Phalloides

2 Destroying Angel / Amanita Virosa in Europe / Amanita Bisporigera, Amanita Ocreata in eastern and western North America / Another European species of Amanita referred to as the destroying angel, Amanita verna /Amanita Magnivelaris

3 Pholiotina rugosa

4 Deadly Galerina / Galerina Marginata

5 Common Earthball / Scleroderma Citrinum

6 Sulfur Tuft / Hypholoma Fasciculare

7 Jack o' lantern / Omphalotus Illudens

8 False Parasol / Chlorophyllum Molybdites

9 Magic Mushrooms / Psilocybin Mushrooms / Psilocybe, Panaeolus, Inocybe, Pluteus, Gymnopilus, Pholiotina

10 Conocybe Filaris

11 Webcaps / Cortinarius

12 Autumn Skullcap / Galerina Marginata

13 Podostroma Cornu-Damae

14 Deadly Dapperling / Lepiota Brunneoincarnata

15 Amanita Muscaria

The extraction of the poison is very easy. Simply boil the mushrooms in water with the lid on.
It is important that the lid is on because the vapors could be dangerous.
And let the water cool down fully before removing the lid, to avoid vapors.

Boil the mushrooms for 1 hour.

Tetrodotoxin

LD_{50} 0.03 mg/kg (oral)

Pufferfish (fugu) contains tetrodotoxin.
The liver and eggs (especially in mature females) have very high concentrations.
Pufferfish often have regulations to ensure only trained chefs or registered restaurants can purchase it. But it is still very much possible to purchase or order the fish from Japanese markets.

Similarly to amatoxin, you extract it by dissolving the organs (liver and eggs) in a water-acid solution like vinegar.
After filtering off the solids you are left with a toxic solution.

Botulinum Toxin

Route of exposure	Estimated human LD_{50}
Intravenous / Intramuscular	~1 ng/kg
Inhalational	~3 ng/kg
Oral (ingestion, foodborne)	~1 µg/kg (≈ 0.001 mg/kg)

Botulinum toxin is the toxic and active ingredient in botox. It is given in extremely small amounts to paralyze parts of a woman's face to prevent wrinkles.
But in larger concentrations it can paralyze and prevent the functions of the human body and thus kill the person.

It is illegal for people who are not medical professionals to purchase botox. But it can be unofficially purchased from beauty centers.
Especially from latin american or east asian owned businesses, and in latin american or east asian countries.
Good nationalities or nations as sources are:
Singapore, Thailand, Colombia, Brazil, etc.

Commercial forms are marketed under the brand names Botox (onabotulinumtoxinA), Dysport/Azzalure (abobotulinumtoxinA), Letybo (letibotulinumtoxinA), Myobloc (rimabotulinumtoxinB), Xeomin/Bocouture (incobotulinumtoxinA), and Jeuveau (prabotulinumtoxinA).

Amygdalin

LD_{50} 0.5-1 g/kg (oral)
Amygdalin is a poisonous substance in fruit seeds. This poison is famously known to be very present in apricot seeds.

Procedure for extraction:[90]

10 gram of amygdalin kills anyone

150 grams of seeds gives 4.2 of amygdalin

300 grams of seeds would give approx 8.4 grams of amygdalin. Which should be enough to kill the average 140 kg man.

Needs to be orally ingested by the victim.

Amygdalin can be found in apricot kernels. Inside an apricot is the fruit endocarp, which is a shell called pyrena, stone or pit, that contains the seeds. Using a nutcracker one can open the pyrena and take out the seeds.

To extract the amygdalin from the seeds:

1 With a blender or mixer, turn the seeds into a fine powder.
2 Prepare a nitration vessel with a glass funnel on top, place a coffee filter in the funnel. Then add the seed powder to the funnel. Place also a beaker beneath the vessel to collect the dichloromethane and fats from the seeds.
3 Pour dichloromethane in the funnel until it covers the seeds. Wait until the liquid turns yellowish, then open the vessel and collect it in the beaker. If needed repeat this process.

Notice the collected liquid is a mix of fat and dichloromethane, one could then boil and distill the liquid to collect the dichloromethane for further use.

[90] "HOW TO ISOLATE AMYGDALIN TO APRICOTS SEEDS. #ncchem", NCCHEMISTRY, 13 Jan 2023, https://www.youtube.com/watch?v=swYeDieRda8

4 Take the seeds and place them in a wide beaker and place the beaker on top of a hot plate. Heat the hot plate to 50 degrees celsius and let the seeds fully dry.

5 Prepare an airtight round bottom flask on a hot plate, add pure ethanol and the dry seeds, then boil and reflux the mixture for 2 hours. Let the mixture cool down.

6 Separate the solids by filter or by suction filter. Collect and save the liquid.

7 Boil and reflux the solids in distilled ethanol, for another 2 hours, before filtering or suction filtering the remaining solids.
Have the liquids be collected in the same beaker that collected and saved the previous liquid, from reflux.

8 Let this liquid, that's yellowish, and the glass container it is in, be placed on the hot plate again.
This time connect the container to another and empty one for distillation. Turn the heat on slightly for the ethanol to evaporate and move into the other beaker.
Once it becomes syrup like in color and consistency, turn off the heat and let it cool.

9 Add a lesser amount of ethanol and stir vigorously, to dissolve it slightly.

10 Now add, half the amount of ethanol used in step 9 worth of, diethyl ether. Which will make the amygdalin precipitate.

11 Collect the amygdalin by filter or suction filter. If felt that needed, repeat the precipitation process, meaning step 9, before emptying out the filter.

12 Collect and dry the amygdalin. The fastest way is by doing so in the oven at 50 degrees celsius. But one could also just leave it to dry in the sunlight.

Intoxicants

These are in modern times normally administered by medical professionals using machines that regulate the exact concentration of the sedative that the patients breathe.
But prior to those machines this was commonly done by putting a few drops on a rag and placing it on the patient's face. Sometimes a mask or rag was places slightly away from the face, and a few drops were applied regularly to keep the sedation going.

It is important to recognize that it takes several minutes to safely put someone to sleep doing this. And that it is a movie myth that one huff from a rag will immediately sedate a person.

So if you are going to try and sedate a person against their will, like in a kidnapping, you need to hold the rag on their face for at least around 5 min.
And you need to keep applying the sedative to keep them asleep for longer periods.

Further these sedatives can be given orally, meaning they drink the sedative, but this is more dangerous and unpredictable.
Because this is more prone to overdoses and can cause death.

That is why you can poison someone to kill them using these sedatives, if that is the intent, and in that case you simply add the lethal dose to their drink.

But to put them to sleep you either use a very small amount in their drink or dose them with a rag for several minutes.

ED stands for effective dose. Meaning the dose that at a certain likelihood achieves the effect. When talking about sedatives naturally the effect is a sedation.
ED_{50} would be the dose that causes a sedation 50% of the time.
Normally it is written as in % of air. Like the concentration of the air.

But this is not really relevant/practical if doing the rag method.

When giving a sedative with a rag, you simply add a few drops or more, and hold it against them until they fall asleep. But since the victim is resisting, I suggest using more than just a few drops.
And because the sedative liquids vaporize quickly, it needed to prepare the rag right before usage.

Further, you observe the person being sedated to determine how to continue applying the sedative.
This is important to avoid an overdose.

Stage / Plane	Key Signs & Reflexes	Breathing / Pulse	Clinical Relevance
Stage 1 — Analgesia / Induction	Conscious, responds to verbal commands; pain perception reduced; may feel dizzy or euphoric	Breathing normal; pulse normal	Patient can feel pain b may be relaxed; not ready for surgery
Stage 2 — Excitement / Delirium	Involuntary movements, struggling, shouting, irregular movements; eyelid & corneal reflexes present; pupils often dilated	Breathing irregular, sometimes holding breath; pulse rapid	Dangerous stage; airv at risk; avoid surgery here
Stage 3 — Surgical Anesthesia	**Plane 1:** Eyelid reflex lost, swallowing reflex may persist; **Plane 2:** Good surgical plane, regular respiration, relaxed muscles; **Plane 3:** Deep anesthesia, shallow breathing, flaccid muscles; **Plane 4:** Very deep, diaphragmatic breathing only	Pulse gradually slows; becomes weak in Plane 4	Stage where surgery i performed (Plane 2–3 optimal); close monitoring needed to avoid overdose
Stage 4 — Medullary Paralysis / Overdose	Pupils fixed & dilated, reflexes absent, muscles limp	Respiration stops, pulse weak/absent	Life-threatening; immediate resuscitati required

Key Observational Parameters:

- **Pulse:** rate, rhythm, strength
- **Respiration:** depth, rate, regularity
- **Eyes:** pupil size, eyelid reflex
- **Movement / reflexes:** response to stimuli, coughing, swallowing

Diethyl Ether

Diethyl Ether is found in starting fluid with heptane. When extracting the diethyl ether you can extract the heptane also which is useful. You can even add the heptane to the fuel tank in the car.
These starting fluids are generally:
60-85% Diethyl ether.
5-15% Heptane.
10-20% Propellant gases.
5% Additives

Check the contents before so you know how much to expect to be produced, when extracting the diethyl ether and heptane.

Remember diethyl ether should be stored over sodium metal or sodium hydroxide to prevent the formation of peroxides.
And of course keep open flames away from diethyl ether and the extraction procedure as these components are very flammable.
And ideally keep the area well ventilated even when using air thigh distillation set up. Because you will replace the distillate flask to receive the heptane.

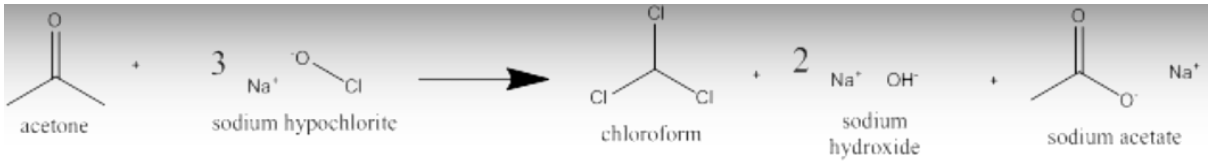
The reaction is a simple distillation.[31]
Diethyl ether has a boiling point of 34.6 degrees celsius.
Heptane has a boiling point of 98 degrees celsius.
But notice that usually it is “branched heptane” being used in starting fluids and these have a boiling point between 79-94 degrees celsius.
Meaning you should be prepared and already have swapped beakers when finished distilling over the diethyl ether.
In case it comes early.

You can also prepare diethyl ether:
2 C2H5OH (+ H2SO4) → C2H5-O-C2H5 + H2O (catalyst)
This reaction is done with temperatures around 140 degrees celsius. If the temperature is well above 140 degrees celsius then ethylene (C2H4) will form instead.

Basically mix ethanol and sulfuric acid, heat to 140 degrees celcius and stir. Because of the elevated temperature you will be distilling over the diethyl ether and water.

So mix ethanol and sulfuric in a distillation set up, heat and reflux, and collect diethyl ether and water mix.
And again store diethyl ether over sodium hydroxide. Peroxides are dangerous and can be explosive and preventing their formation is ideal.

Chloroform



For 100g chloroform:
49 g or 62 ml Acetone (pure)
1.87 kg or 1.87 L Sodium hypochlorite (10% conc)

Sodium Hypochlorite can be found in regular bleach. But check the concentration and adjust for that. 10% concentration bleach is common check for those.

Procedure:[91]

Cool down the bleach to 0 degrees celsius. Put it in the freezer with a thermometer and check it regularly, once it reaches 0 degrees celsius, you can begin the synthesis. This step is done to prevent the exothermic reaction from getting hot enough to boil the chloroform away.

Open the bleach bottle and add the suitable amount of acetone.

Close the bleach bottle and shake the bottle for a few minutes.

The reaction is exothermic and will produce heat, but is not dangerous.

Leave the bottle open, overnight, outside. While the reaction takes place overnight, the bottle should be open to let out gasses that form, and prevent pressure build up.

The chloroform will form at the bottom. Decant the upper yellowish liquid. Then pour the remaining liquid into its own beaker

Let the beaker and its content sit for several minutes. This will let the chloroform settle at the bottom. If needed, decant more of the upper yellowish liquid.

Pour the remaining liquid into a separatory funnel, wait several minutes again, so that the chloroform will sink to the bottom. Then collect the chloroform into its own beaker, without the upper liquid.

[The chloroform is still mixed with water, to help achieve pure chloroform, add it back to the separatory funnel with saturated sodium chloride and water solution. Mix, then wait and let the chloroform settle. Separate it onto calcium chloride, mix.
Lastly, distill the product into its own beaker at 60 degrees celsius.. Chloroform will be the first product to come over around 60 degrees celsius. This will leave essentially pure chloroform.]

Add the chloroform to its own bottle, preferably wrapped in tin foil, if need be, to protect it from sunlight.

Add the ethanol to the chloroform before storage. This stabilizes the chloroform and prevents the formation of phosgene.

[91] "How to Make Chloroform", TheChemistryShack, 13 Sep 2016, https://www.youtube.com/watch?v=7ilKvNmPDy8&t=29s

Notice: burning chloroform creates phosgene gas.

Notice: when disposing the products of this reaction, do not just pour it down the drain. Even the yellowish remaining liquid contains enough chloroform. Instead store the waste in a bottle and throw it along with regular trash.

Notice: Chloroform can be sedative when inhaled or ingested (and reasonable when injected, it probably active once it reaches the bloodstream).

Notice: It is a movie myth that a rag with chloroform will render someone unconscious immediately after a single breath. In reality it would take several, about 5, minutes. Chloroform is also very volatile which means it evaporates into the air very fast, when in contact with the air. So the rag would have to be prepared immediately before being used.

The realistic approach to deliver chloroform to sedate is by ingestion. But in this method administering a correct dose may be harder. When inhaling the effect takes time and once the effect of sedation is being noticed, then one removes the chloroform gas. But when giving it for ingestion there's already a certain amount to be given, since it would be hard to keep having a person be tricked into ingesting chloroform over and over again.
Unless the goal is to kill, in that case there wouldn't really be a too big of a dose to give, considering how easily and cheap one can make chloroform.

Chloroform is a colorless liquid, with a strong pleasant etherlike odour and a slightly sweet taste. This makes it possible to hide it when mixed with or diluted in water. But it is even harder to notice it when mixed with an alcoholic drink, since they already have a strong smell and some have a sweet taste.

Chlorobutanol

Chlorobutanol is prepared by first doing the chloroform reaction of acetone and bleach. And then using potassium hydroxide.
Chlorobutanol is not a liquid like chloroform but instead is a white powder.

ED_{50} 0.3-0.8 g/kg (oral)
(this is weight by body weight, doing oral consumption for 50% likelihood of sedation)

Procedure:[92] [93]

acetone, bleach, potassium hydroxide (these can be cooled in a fridge before synthesis)

900ml bleach
100ml acetone
+100ml freezing cold acetone
4.7g potassium hydroxide

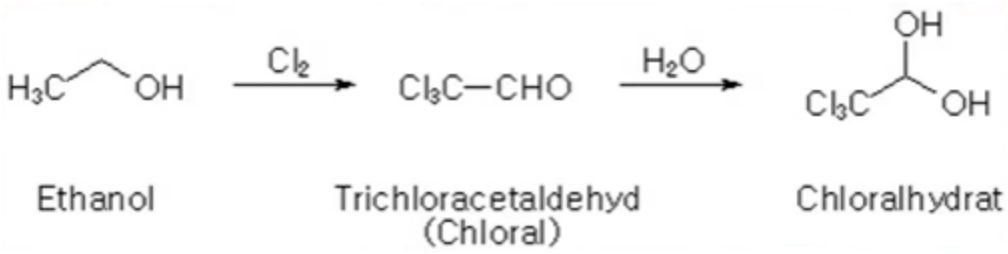
Cool down 10% sodium hypochlorite bleach to 0C.
Add acetone and quickly stir.
Chloroform will precipitate at the bottom, collect the bottom layer which is chloroform.
(purifying the chloroform before proceeding might increase yield but is not necessary)
Cool down the chloroform and keep it between 0-10C always, if needed pause and let it cool down before proceeding. (ice bath)
add cold extra acetone
Slowly add potassium hydroxide while stirring. Again keep it under 10C
Let the reaction continue for 30 min or 1 hour before going to extraction, basically let the reaction go through all the way

Then distill over and collect excess acetone, acetone boiling point is 56C, but it is recommended to heat the mixture to 82C and then stop distilling.
Then dump the mixture into a beaker with ice.
Chlorobutanol will precipitate out as it mixes with water.
Collect the crude chlorobutanol with vacuum filtration
Add the crude product to hot ethanol, slowly and stir heavily, until it all dissolves, then add hot water
Place it on an ice bath, cool it to 0C
Vacuum filter and collect.
(this is pure chlorobutanol, but wet, to dry it:)
dry under vacuum dessication

Should give 20.84g yield
35.2% yield (based on initial volume of chloroform)

Chloral Hydrate

[92] "Making a Hypnotic Sedative from Acetone", Apoptosis, 15 Jun 2024, https://www.youtube.com/watch?v=fXIlkGNRcPE
[93] "Making an old hypnotic sedative and preservative", NileRed, 17 Jun 2017, https://www.youtube.com/watch?v=TzbkRC3rYEo



Bubbling chlorine gas into ethanol, and then adding water will generate chloral hydrate.

Chloral hydrate decomposes upon boiling the mixture (at 98C). So normal distillation doesn't work to remove excess water and ethanol.
Instead use vacuum distillation.

There's a procedural video that does show synthesis with a low yield. But nonetheless a successful yield.[94]

Theft

General methods of breaking in

Locks

Locks can generally be breached in two ways; lock picking and lock breaking.

Lock picking can be done using hair pins and metal pins, or using lock picking tool sets.
These can be purchased and there are some quite advanced lock picking tools, which is why electronic doors and unusual key shapes have become popular.
And some old doors could be fiddled open by using credit cards to slide the lock away in between the door and the frame.

This is quite easy and fast to learn since it is a known "science" and one can simply buy a lock picking set and start practising on locks and use internet tutorials.

But there's also key molding. Which is useful if you only have temporary access to the key.

[94] "Synthesis of chloral hydrate (OTC)", Hazel Chem, 30 Dec 2017, https://www.youtube.com/watch?v=LnwuKRMGyh4

One places the key into a mold and can then use that to make a copy of the key.
In fact one can go to a keymaster or boutique and ask them to make a copy of the key you have a mold for.
Or you can yourself melt cast it.

The CIA has a field manual to copying keys.[95]

Lock breaking is the other method.
For most locks you can bend, smash or cut them using normal tools. Like a hammer, crowbar, lock cutter, fence cutter, etc.
There are also powerful drills which can drill through surfaces to drill apart the lock.

Otherwise there is lock melting. Which is done using blowtorches, liquid nitrogen or thermite.
Notice that blowtorches and thermite burn hot enough to melt the lock. But liquid nitrogen freezes the lock and then can be easily smashed.
Lastly, one can penetrate locks with weapons. The police usually use shotguns to destroy door locks and hinges to break in.

Fences

Fences are very easy to break through.
There's the classic of climbing fences, and one can use a rug to cover any barbed wire. And this is done if one doesn't want to leave any traces.
Otherwise one can very easily just cut the fence.
Fence cutters are pliers strong enough to cut a hole through the regular metal fence.

Windows

Windows are easy to break to access the lock on the other side. But one can also break a window and clean off the edges to crawl through it.

But it should be noted that it is much better to first scan the building for open windows. Open windows allow access into the building without causing unnecessary noise or evidence of a break in.

But if one is going to break a window, it is recommended to throw a rock through it, rather than smashing it with a tool. Because breaking a window with a metal tool in your hand can shoot glass fragments and hurt the hand.

[95] "CIA Field-Expedient Key Casting Manual", 1988, https://ia600108.us.archive.org/34/items/CIAFieldExpedientKeyCastingManual/CIA%20-%20Field-Expedient%20Key%20Casting%20Manual_text.pdf

Safes

Similar to locks you can purchase locksmith tool sets that are used to breach safes.
And the methods of breaking safes are not a secret.
For visual demonstrations you can simply look for youtube channels showing the methods, like the following reference.[96]

Strong safes usually require drilling into the lock and turning the lock from the inside.
Electronic locks can sometimes be short circuited to open.
And hotel safes can sometimes be opened manually by simply hitting the safe with a mallet and turning the handle at the same time.

Target locations

Supermarkets

When robbing supermarkets, what you are looking for is cigarettes, nicotine products, caustic soda, baking soda, drain cleaner, anti freeze, stump remover, bleach, pool cleaning chloride tablets, clothes, shoes, perfumes, jewelry, tools, medicine, safes
Look into what the supermarket has in stock before robbing, so you know what you are looking for.
Remember the items could also be in the storage area, and not in the open area.

The cash registers are often counted at closing, then the money is put inside a safe with lock, it will then go to the bank.
Some places do this weekly or even daily. One can check the registers when robbing to make sure, if there would be anything there. but likely there's a safe somewhere with the money.

A good rule of thumb to help memorize what is valuable:
tobacco, chemicals, clothes, jewelry, medicine, safes.

School Laboratories

Schools have generally three places worth stealing from:
The lab, computer room and teachers room.

The lab is the primary target because it has useful acids, and chemicals. But some schools can even have small amounts of radioactive material for demonstrative purposes.
What you look for in the lab:
Glass beakers and equipment, hot plates, magnetic stirrers, really any lab equipment.

[96] VaultCracker36 https://www.youtube.com/@VaultCracker36/videos

Sulfuric acid, nitric acid, hydrochloric acid, nitrates, nitrites, hydroxides, liquid nitrogen, ammonia, really any chemicals.

Now also if possible, check for containers to tables with small radio active materials. These radioactive materials can be used to poison and kill targets.
If they were sneaked into a victim's drink and they drank the material they would become violently ill and soon die. And medical professionals would have a real hard time figuring out they were poisoned with radioactive material.

You should also check the computer room. These computers can be factory reset and sold.

Lastly, sometimes teachers leave valuable belongings in the teacher’s room, so check for jewelry, or computers, or anything else miscellaneous they might have left.

To steal from schools is quite easy in reality if properly prepared. Having someone on the inside, who goes to that school, allows you to leave a window open, which is usually enough.
But I recommend spending a few nights observing if there are any security guard checks. The smaller and lower grade school usually the lower the security.
But universities and colleges usually have routine checks at night by security guards. And they kick people out at night to close the school.

But again it is quite easy to just leave a window open close to the laboratory or inside the laboratory, and then stealing its contents can be done pretty quickly using a few men and a van.

Offices

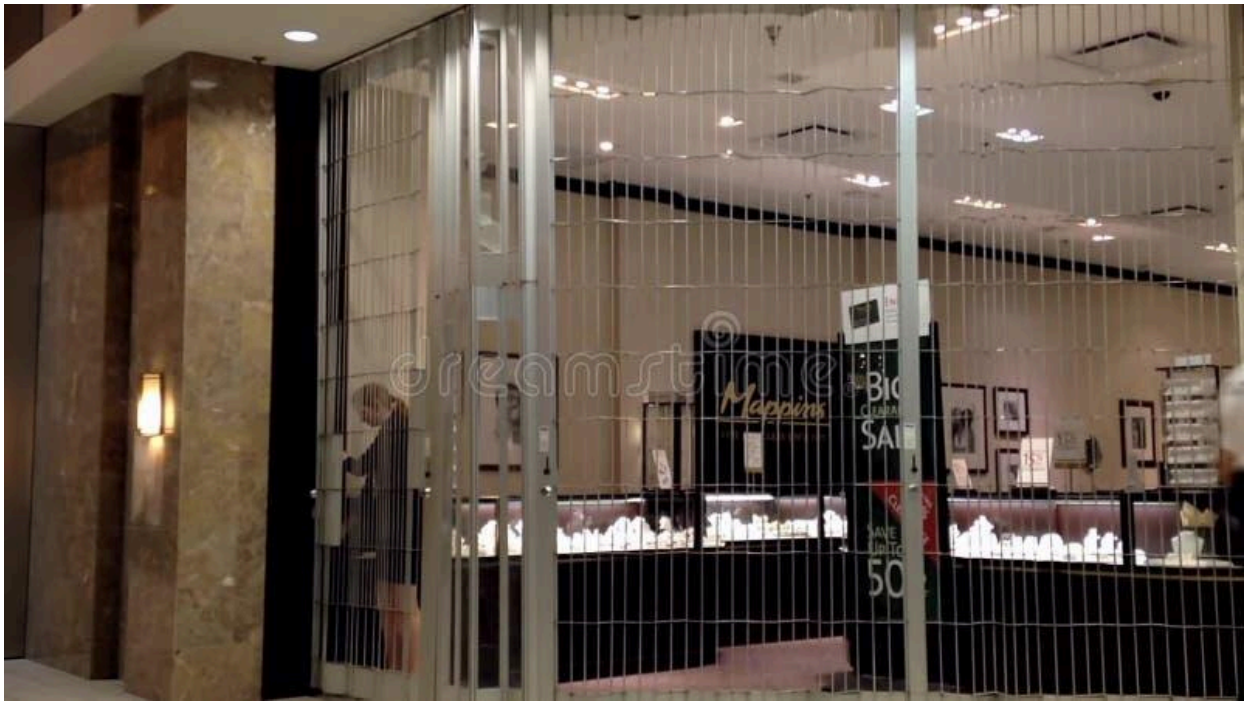
This has valuables like computers, routers, tvs, etc. Electronic devices are very valuable.
And these are usually closed over weekends.
Some do use security guards that will show up at different times during the night to patrol the office.

So to rob these it is recommended to first observe the office during weekend nights, and see at what times the security guard will show up.
And then time the robbery when he is not there. Or you simply bring a weapon and subdue or kill the guard. In the best case scenario the guard has a gun, in that case you can take the weapon after having subdued or killed him.

Jewelry Stores/Diamond Stores/Currency Exchangers

Small ones usually only use a metal fence behind the door and window to prevent a thief after the glass is destroyed.

But these can easily be cut through using a metal saw blade. Or the lock on the bottom can be broken and the metal fence/gate can be lifted.



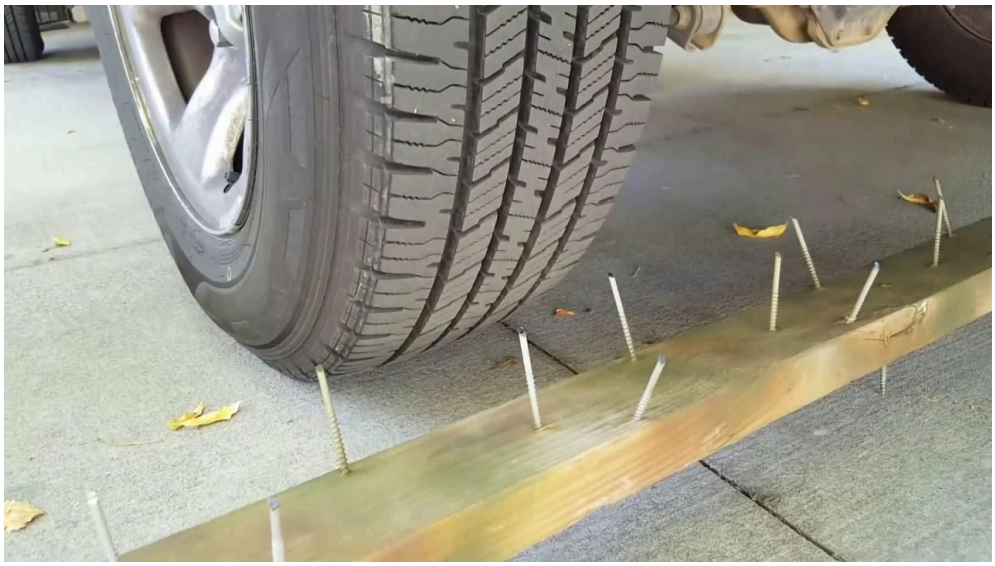
And so many small stores like these are not difficult to rob but do notice that it takes longer time. And so more effort is needed to make sure there's a time window.
It is very important to observe the store at night, and check guard routines, how public the place is.

If it is a small store, with very little surrounding activity like guards or passerbyes.
Then a robber usually just requires stronger tools like a saw blade.

Now larger jewelry stores will often have electronic alarms on the glass. And this is the biggest problem with robbing jewelry stores in general. Small and large can have these alarms.
And so being prepared to escape and having an escape route is always good, in case the alarm gets triggered.
Usually it wouldn't be worth trying to continue the robbery if the alarm is triggered as soon as the glass is broken.

But of course the police have a response time of a few minutes. And longer in certain areas.
Depending on the area one could attempt a "smash and grab", in which you do smash the glass and just grab what you can as quickly as possible.

But if doing this there are some measures one can do to help prepare against the police.
That is planting out road spikes shortly before the robbery. Blocking certain roads.



These are simply sharp metal objects that can stand on their own, and will puncture a tire on a vehicle.
The robbers can use this to cut off, delay or sabotage the responding police cars. And thus buy more time.
These are also very easy to improvise at home.
In fact one could even break a bunch of glass and place it over the road.
Just don't block your planned escape route.

Some criminals do attempt another method of trying to divert police resources by for example detonating a bomb or shooting in another town close by. Hoping to make the police mobilize in that town.
Though I would note this usually only makes sense in smaller towns. Because a large city will have enough police to handle both situations, the decoy and actual robbery.
And the decoy could if anything just put the police on high alert and thus make them more ready.

Lastly what some criminals have done in the past that is effective is leaving a bomb or fake bomb when leaving the scene of crime.
The idea is that a fake bomb or real bomb will delay the police from chasing after the robbers.
And it delays them from investigating or checking the scene of crime until the designated bomb squad arrives.
And this can be especially beneficial in small towns, because they usually don't have bomb squads ready like larger cities. And thus they wait for the bomb squad to drive a longer distance. And possibly delay the police several hours.

Banks

Robbing banks is in modern times not really worth it.

Strong glass and vault doors makes it almost impossible or too time consuming to break in.
And silent alarms are triggered by clerks as soon as the robbery begins. So normally the police will arrive quickly when a robbery begins.

And lastly even if you broke in, or forced the clerk to open the vault before they could trigger the alarm, there's "dye packs".
Even after a successful robbery, the stacks of cash have placed in them dye packs, which detonate at a certain distance from the bank. And marks the money with a permanent discoloration and thus makes them useless.

When cash or gold is delivered to and from banks with armoured cars, the dye packs have been removed.
So most of the time it is a much better strategy to try and rob the bank while it is transporting its money.
This is done by observing a bank physically or electronically and trying to identify when they perform the transportation.
And then doing the robbery aggressively, meaning you kill the guards quickly and take the money (and the guards weapons) and drive off.

After having performed a successful robbery, either by robbing the bank, or the transporting armoured car, I suggest checking the cash with a metal detector to try and remove the dye packs. Before driving too far away from the bank.
This is good to do for safety even when it's not likely that there's a dye pack.

Atms

Atms are filled like banks and have vehicles that transport cash to them.
And so similar to banks, one type of robbery is to rob the vehicle when they take out the money from the vehicle to fill the Atm.

You first start by observing Atms, and identify when they are filled. You can also notice when an Atm is empty, if they function but you can't withdraw money. These should be prioritized to be observed, because they are likely refilled sooner than later.

Otherwise you can also follow a person and check them by typing their pin code for their card at a store, and then pick pocket the card and withdraw money with it at an Atm.

Lastly some criminals have performed robberies of Atms by breaking into them and stealing the cash. This needs to be done at night. And usually involved either prying it open with a tool or exploding into the Atm.
But the problem is that this is very much something that is learned through practice. One needs to try on an Atm what works.
Using too much explosive could in fact damage the money and thus it is something criminals have done but is difficult to perform.

Gasoline theft (stealing from vehicles, gas stations or pipelines)

Fuel can be stolen from most vehicles using syphoning. Simply stick a rubber hose into the fuel tank and suck the gasoline out. And it will start pouring out on its own.
But notice that in modern times they have placed locks on the fuel tank, but these can be forcefully opened with tools.
And that there may be a filter into the fuel tank. And that could require a metal stick or pipe to break it, by sticking into the fuel tank and hitting the fuel tank to puncture the filter.

But there's also fuel trucks which transport large amounts of fuel to gas stations. These can easily be robbed by simply threatening the driver and stealing the vehicle with the fuel load.

Gas stations are harder to rob.
Gas stations have beneath them a large tank with fuel. And so one could in theory drill into the ground to the fuel tank, and use a pump machine to pull the fuel out.
It is fitting to pretend to be construction workers to avoid suspicion.

Fuel pipes.
These can also be robbed. Some of these are above ground and the idea would be to detonate a charge beneath the pipe and explode a hole into it.
The fuel can then be collected as it pours out.

Car theft

In the past stealing cars was much more easy, and usually involved short circuiting the wires for the lock.

This was called “hot wiring” and forcibly started the vehicle. It was done by breaking the barrier beneath the steering wheel, and connecting the wires to the start button/lock and trying to start the car.
This would bypass the lock, as the key normally would close the circuit, but when short circuiting you bypass that.

Nowadays it has become more technical and sometimes they find niche ways to hot wire certain cars.
The phenomenon of “Kia boys” is an example.
They would break the barrier and then break the lock off. And then short circuit the system with a phone charger, that surprisingly fits and can turn the system (simulating the key).
This is demonstrated by the following video.[97]

But there’s always the option of stealing the car key from the driver. Either when he’s close or in the car. Simply intimidate or most aggressively kill the driver, take the key and drive off.

Now some cars have GPS tracking devices. These are sometimes placed on the roof of the car. But there’s also GPS trackers as part of the model of the car.
These are sometimes listed and sometimes not listed in car model instruction manuals. And so if you are planning on stealing a new and expensive car, I suggest checking the manual for that model to see if there’s a GPS tracker.
Otherwise if you are stealing an old and cheap car this is not necessary.
Lastly you could even use an EMP device to disrupt the GPS signals when stealing and moving the car. But this is often not necessary since the car is only noticed stolen long afterwards.

Even if you can’t steal a car, you can easily steal the license plates with a screwdriver. And these license plates can be used on cars involved in crime.

A stolen car can have two purposes:
1 To sell it, and this is best done by stripping it and selling it in parts. But saving the useful liquids and parts.
2 To use the car for crime, which is advantageous since it can be abandoned if needed.

If you are going to strip a car the parts you should save at least are:
Fuel tank:
contains gasoline

Engine:
contains starter fluid (diethyl ether, heptane),

Cooling system:
contains antifreeze (ethylene glycol),

[97] “How easy it is for the Kia Boys to steal a car”, https://www.youtube.com/shorts/acO1C8xH2T8

Brake system:
contains brake fluid

Car Battery:
contains battery acid (30% sulfuric acid, 70% water), may also have lead sulfate,

Airbags:
contains sodium azide, explosive material

The rest can be sold off.
There are many tutorials on the internet on how to strip a car.

I suggest stripping the car at a remote location, or even outside at a remote location. In case the car is tracked, then the place is not tied to yourself.

Lastly I suggest always removing the vin number from a stolen car. Because this makes an identification of the car much harder.
And so whether used for crime or sold off, it is much harder to identify the car.

Home Invasions

These are not complicated but I wanted to add a nuance:
In many countries sex offenders have public addresses and are not allowed to own guns. So they can be targeted for home invasions.
And since they often live alone and don't own guns, you can easily subdue or kill them. Or wait until they leave and then rob the house.

Gun stores or Hunting shops

These have all sorts of useful equipment, not just weapons.
The weapons and ammunition are usually displayed openly or stored in safes. So I suggest bringing safe cracking equipment in case. Because there's usually safes for guns and cash in these stores.

Either you rob the store when it is open, and kill the owner and start looting.
Or you start the robbery in the evening when the store is about to close, and you take the key from the owner when he's about to close.
Or you attempt a break in at night, but do mind that sometimes they employ the same security that jewelry stores or currency exchangers do, metal barriers and glass alarms.

Lastly the things you look for are:
Guns, ammunition, active hearing protection, headsets, radios, optics, binoculars, night vision goggles, camo clothing, sights for weapons, backpacks, boots, tactical vests, magazines, ghillie suits, etc.
Really any equipment relevant for a paramilitary unit.
But then of course cash.

Other Methods and Targets

Street Robberies

Very straight forward. Find a vulnerable target, preferably alone, and threaten them, doing so in a group is more intimidating.

But I recommend targeting drug dealers. They are usually not hard to find at night in very public places. They carry a lot of cash on them and drugs.
They are often in groups and carry some kind of weapon. So it is suggested to just kill them on sight and empty their pockets quickly.

Kidnapping

Safest way to conduct a kidnapping.

1 Finding your victim
2 Stalking, information gathering
3 Preparations
3.1 Storage place (locked doors, sound safe), (either have food, water, heat prepared) (one stays there to watch the victim), (should be far from kidnapping place),
3.2 Payment method (best option cryptocurrency monero),
3.3 Two vehicles used (kidnapping vehicle, safe vehicle) (switching point)
3.4 Equipment (zip ties, tape, ballgag, sack)
4 Kidnapping
You follow the victim on their routine and go when they are ideally alone and far from cameras and neighbors.
Then they are tied up and gagged. If you plan to release them put sack over their head to neglect them seeing something.
Driven to a remote and safe location with no possible people or cameras. Switch vehicle. And drive him to the storage place.
At the storage place he doesn't need to be tied if there's sufficient locks on doors and no windows, and they don't need to be gagged if the room is soundproof or there are no neighbors.

5 Release
Simply done by driving them to a remote location, and giving an anonymous tip to the police.
It is important to state that releasing the hostage is important for further kidnappings, showing that the family can get their member back.
And one shouldn't rape or do other things leaving unnecessary dna on the victim. So having them shower before release is not bad.

Ransom

In the past kidnappers often asked for payments in cash. Which is really stupid. Firstly it requires a physical transfer and meeting, which almost always results in a sting operation by the police. Secondly cash has serial numbers like most things and can thus be traced afterwards.

So ransom should always be done via crypto currency.
It is much superior. The transfer is done anonymously online. The currency can then be withdrawn from different currency exchangers accepting the cryptocurrency. And the purchase can be verified, the victim isn't released until the balance is met.

The best most private and untraceable cryptocurrency currently available is monero.
There's even an initiative to create a marketplace for monero.
https://monerica.com/

Fraud

Counterfitting

It should be noted that it is very hard to slip counterfeit material past experts in a boutique. It can happen but I recommend going to less professional and knowledgeable places like pawn shops.
These don't have the same expert knowledge, testing equipment and are less prone to perform more rigorous checks.
Pawnshops on the other hand are more prone to offer very (scandalously) low prices. But since you are scamming him with the product you still make money on it.

Another option is selling the counterfeit product yourself in a pawnshop.
The customers can't check the product and you can offer reasonable prices because the profit margin is still large.
And if complaints from police come accusing fraud, then you can simply claim you purchased the product from a customer and sold it to another.
Walk-in customers buying and selling valuables creates plausible deniability.

But once the police suspects you, the selling of counterfeit products should be seized immediately.
Because a pattern of complaints is what results in an arrest and conviction.

Gold

Gold has a density of 19.3 $g/cm^{3.}$.
Tungsten has a density of 19.25 g/cm^3.

Gold is much more expensive than tungsten.

Melt cast method:
Melt gold to make a plate. put the plate in a mold. add the tungsten, make sure it does not touch the walls of the mold. Melt gold and pour it on the tungsten. Press any markings you want if any and let it resolidify.

It is therefore possible to coat tungsten with gold. Making it look like a real goldbar and it almost weighs the same, just a very small difference in weight, a barely noticeable discrepancy.
This has been exploited by jewelry stores in Manhattan and been reported on.
A very complex organization was able to produce seemingly real gold bars with real serial numbers and stamps. These gold bars were then sold for market value of gold around 18000 dollars, when it turned out they were actually worth 3600 dollars.

This trick only works with metals as heavy or heavier than gold, with the same density or greater density than that of gold.

Because the volume of the gold item can be measured and an expected weight can be tested. And so using a metal that has too low density, that is too light, will be noticed.
And it is not helped by adding more of the metal inside the gold. Because that increases the volume and the expected weight. The weight of the bar will grow closer to the weight of the non-gold metal for that volume, than the weight of gold for that volume, when the non-gold metal increases in ratio.
So adding more non-gold metal will only increase the discrepancy.

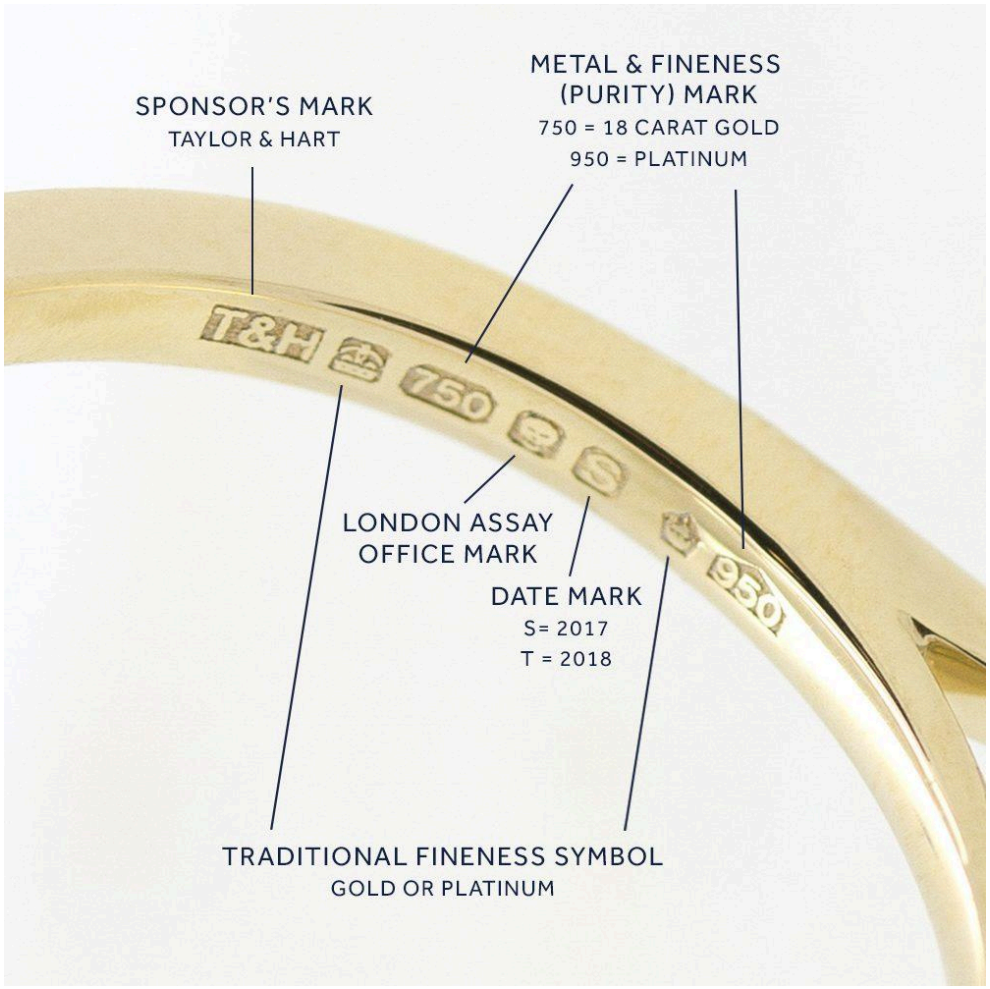
This trick only works when the volume of the item matches that which is expected for gold.
So using an item like tungsten which weighs close to gold works. And using items which weigh more will work, because you can always reduce the amount of non-gold metal inside the gold, leaving some empty space.

Platinum has a density of 21.45 g/cm^3.
Platinum also costs generally about half of what gold costs.
So one could hollow out a gold bar and add a piece of platinum corresponding to the same weight of the gold removed.
The platinum could also be melted and poured into the gold bar to make it stick more.
Then melt the gold around the edges to seal up the hole.
One could also, and this might be simpler, melt gold and form a hollow gold bar, and then pour the platinum needed to give it the right weight.
Preferably in a way to form the serial number, stamps and markings again and in the appropriate place.

Note:
Make sure to not destroy the front side or the side with serial numbers, stamps or markings, these are the proofs of its legitimate origin.

Most pieces of real gold, including coins, bars and jewelry, should have a stamp that shows the purity of the gold. You may need a magnifying glass to see this, but you should be looking for a mark that displays either the fineness of the product (such as ".999") or the amount of karats that it contains (such as "24k").
So pressing this mark on it will make it seem more legit.
But you need to check if there's any common markings for your particular country.

This is a basic marking easily replicated.



And this is one using many more markings. Some of which are fitting for the country or region they are from.

Silver

Similar to gold, silver can be coated onto a cheaper metal with similar or heavier density.
This has commonly been done using lead.

Silver has a density of 10.49 g/cm^3.
Lead has a density of 11.34 g/cm^3.

Lead is much cheaper than silver.

Silver coated lead and empty space can thus work as counterfeit silver. Sold in total for the price of silver.

Diamonds

There are many diamond stimulants that are very similar to diamonds in their properties. These are much cheaper than real diamonds and are essentially identical in appearance to real diamonds.
And some or so close in properties and can even fool diamond testers.

Diamond simulants and their gemological properties

Material	Formula	Refractive index(es) 589.3 nm	Dispersion 431–687 nm	Hardness (Mohs' scale)	Density (g/cm^3)	Thermal condc.	State of the art
Diamond	C	2.417	0.044	10	3.52	Excellent	
	Artificial simulants						
Flint glass	Silica with Pb, Al, Tl	~ 1.6	> 0.020	< 6	2.4–4.2	Poor	1700–
White sapphire	Al_2O_3	1.762–1.770	0.018	9	3.97	Poor	1900–1947
Spinel	$MgO{\cdot}Al_2O_3$	1.727	0.020	8	~ 3.6	Poor	1920–1947
Rutile	TiO_2	2.62–2.9	0.33	~ 6	4.25	Poor	1947–1955
Strontium titanate	$SrTiO_3$	2.41	0.19	5.5	5.13	Poor	1955–1970
YAG	$Y_3Al_5O_{12}$	1.83	0.028	8.25	4.55–4.65	Poor	1970–1975
GGG	$Gd_3Ga_5O_{12}$	1.97	0.045	7	7.02	Poor	1973–1975
Cubic zirconia	ZrO_2 (+ rare earths)	~ 2.2	~ 0.06	~ 8.3	~ 5.7	Poor	1976–
Moissanite	SiC	2.648–2.691	0.104	8.5–9.25	3.2	High	1998–
	Natural simulants						
Quartz	Silica	1.543–1.554		7	2.50–2.65		Ancient
Andradite	$Ca_3Fe_2(SiO_4)_3$	1.61–1.64	0.057	6.5–7	3.8–3.9	Poor	Ancient
Zircon	$ZrSiO_4$	1.78–1.99	0.039	6.5–7.5	4.6–4.7	Poor	Ancient
Topaz	$Al_2SiO_4(F, OH)_2$	1.61–1.64	0.014	8	3.4–3.6	Poor	Ancient

The "refractive index(es)" column shows one refractive index for singly refractive substances, and a range for doubly refractive substances.

The best fake diamond is moissanite. Sometimes fooling diamond testers because it conducts heat almost as well as real diamonds.
But another good option is cubic zirconia.

Simply buy these and sell them as “diamonds” in pawnshops.
To make even more money you can mount the stimulant on a ring or jewelry. The piece of jewelry becomes more valuable than the jewelry and stimulant separated.

So one could even make a piece of jewelry with counterfeit gold or silver, and then mount a moissanite or cubic zirconia stone onto it. Ideally a moissanite as it can fool cheap diamond testers (which pawnshop has at most).

In the worst case scenario they spot the fake, and you simply explain your ignorance of its origin or that it was a gift.

Gambling rings

Depending on the country, private gambling rings can be illegal, so check the local laws if you are going to set up a larger one open to the public.
These are very easy to set up and can be very profitable. There’s two types of games a gambling ring can host:
1 Games against the casino, where the house has an advantage, like: blackjack, roulette, etc.
2 Even games between players that require entry payments, like poker.

So 1 is a game offered where each possible bet has an expected win and expected loss, and the expected loss is larger than the win.
(expected win = likelihood of win * payment of win, expected loss = likelihood of loss * bet size)
In the long run the “law of large numbers” will imply that it becomes very likely that the expected results will result. Meaning the more this game is played the more likely the casino will win because the deviating possibilities become less likely.

Game alternative 2 on the other hand is just a game that requires a payment to be played. The casino simply needs to be paid before playing, and the casino doesn’t participate in the game.

These illegal casinos are usually an operation that the mafia would engage in. And that is because they could ensure the security of them.
Security is the main problem with these operations.

The police, criminals and cheating is the main problem of hosting these games.
That is why bodyguards are needed. 2-3 bodyguards where the games are hosted. And 1-2 bodyguards that are lookouts for police.
These should ideally be armed, in case anyone pulls a firearm or tries to rob the casino, they can shoot them immediately.
Further having the players be patted down before entry into the casino is a good counter measure to prevent weapons being brought in.

These casinos perform better also they are hosted at places where people naturally spend a lot of time. That is why these types of casinos or gambling rings are hosted at night clubs, restaurants, strip clubs, bars, etc.
The legal business offers food, drink and entertainment, while the illegal operation is kept in the back. And players can take breaks to eat, drink and have fun before returning.

This is also good because the legal business functions as a front for the illegal activity. If the police show up the lookouts will alert the casino. They lock the doors and ask the players to exit out the back. And then hide the tables.

Fixed Sports Gambling

Fighting sports are usually the best alternative only requiring to convince one fighter to knowingly lose. This allows people to bet a large amount of money that he will lose and guaranteed win.

I mention this particularly as many right wing factions have people and organisations oriented around fitness and combat sports.
I think these are great initiatives and can likely start competing to build fighters with decent records. And when that is done they can be paid to purposefully lose a match, that they are expected to win.
Allowing people to bet against him with huge payouts. This would be a perfect way to finance these organisations.

And the preparation is completely legal. Organisations like Active Club can use this. They should already start training and competing in boxing, mma, etc, under some team.
And then when they want or need money they simply have one of their fighters or connections, “take a dive”.

I would only add one thing that can be a concern. And that is the people in these organisations should avoid getting tattoos blatantly “right wing”.
These kinds of tattoos can be a problem for fighters to compete professionally.

Insider Information

It is illegal for a company to give information about an incoming bankruptcy.
This is because one can then easily “short” the businesses. Which is borrowing a high valued stock, selling it expensively, promising to buy it back later (when the stock will have lost its value).

The hardest part is finding a connection in the company. But when that is done the insider can provide information about the businesses. Ideally that the business is likely going bankrupt within a certain time frame.
That is when you borrow as much of the stock as possible, and sell it promising to buy it back later.
And once the company is bankrupt and the stock is worthless, it is purchased back, and given back to the company.
Giving a large profit margin.

Insurance Scams

Insurance scam is just paying for an expensive insurance and illegally incurring the large payment.
The two common examples are:
1 Asking for a large life insurance, before murdering the person, and collecting the large payment.
2 Asking for a large business insurance, then emptying the business of its contents, before setting it on fire. And then claiming the businesses and its contents were destroyed.

The criminals that get caught doing this, are the ones who change their insurance weeks/days before the scam.
The insurance should be changed well ahead of time before the planned scam.
While having a “coincidence”, like changing insurance and then the accident happens the day after, is not proof of crime, and sometimes legitimately happens, it is still dangerous because all insurance companies will investigate a situation like that.
Again, if the accident happens very shortly after the insurance is changed (or maxed), then the insurance company will investigate it.
And in a trial the insurance-accident timing will be used against you.

Why are many criminals caught by having poor insurance-accident timing?
Because insurance companies when alerted perform “serious” investigations.
They look at information that the often police doesn’t, as police primarily decide upon the crime scene, insurance look at ex insurance-accident timing, and any other info provided like ex medical history

They also have private investigators on payroll, these are known to go as far as to spy through people's windows.

So there are many examples where:
the police came to a death scene, and the murder had been performed ok and accident/suicide staged, and the police conclude accident.
Then the insurance company sees the insurance-accident timing, and then investigates, and then uncover something incriminating (ex paperwork done with someone else's name, changes in pattern of life, details not matching up: victim has perfect health + dies natural causes.)
Then the murderer goes to trial for murder + fraud

The other factor that usually gets criminals caught is attempting to do this several times. Multiple suspect insurance payments creates a pattern which is evidence of insurance scams.

And so this is a crime which needs to be done rarely, with people not connected with each other. And planned well ahead of time, changing the insurance policy way before the crime.
At least possibly half a year before the incident.

Money Laundering

In theory all this requires is a business. Anything really, a restaurant, a gym, a shop, etc.

Money that is obtained illegally can't be spent too much because that will be noticed by the authorities, noticing that your income doesn't match your spending.
So the money needs to seem like legitimate income.

This is done by a business taking the money, and declaring a bunch of business from which the money came.
A restaurant for example can take the money, and prints a bunch of receipts for a bunch of different customers (it hasn't had), and then declare the illegal money as part of their income.
Then the money is taxed and is regarded as legal.

The business then takes their part of the money, before paying you a salary for working there.

This way you do lose money to the government and the business. But you receive a lesser amount of legal money which can be spent without problems.

The best way to do this is to avoid patterns. Patterns like sudden bursts of business.
It looks suspect when some months perform extraordinarily well for the business but the rest of the year have very poor performance.

Avoiding patterns is best done by spreading out the money. Both in time and to different businesses. This way they regularly declare slight amounts of illegal money as part of their legal income, and run a lower risk of being caught.

Assassination

For this chapter I will just refer to the 1953 CIA manual for assassinations. And show its content:[98]

But I will offer some personal reflections on some current time assassinations, at the end.

It should be noted that the best method suggested in the work is to get a person unconscious (sedative, poison, or hitting them in the head) and then tossing them out a window in a tall building, or throwing them over a cliff.

It will likely look for police and medical professionals as a suicide or accident, especially if the victim drank alcohol prior to the assassination.

A Study of Assassination

[98] "A Study of Assassination", CIA, 1953, https://ia601000.us.archive.org/29/items/CIAAStudyOfAssassination1953/CIA%20-%20A%20Study%20of%20Assassination%20%281953%29.pdf

A STUDY OF ASSASSINATION

DEFINITION

Assassination is a term thought to be derived from "Hashish", a drug similar to marijuana, said to have been used by Hasan-ibn-Sabah to induce motivation in his followers, who were assigned to carry out political and other murders, usually at the cost of their lives.

It is here used to describe the planned killing of a person who is not under the legal jurisdiction of the killer, who is not physically in the hands of the killer, who has been selected by a resistance organization for death, and whose death provides positive advantages to that organization.

EMPLOYMENT

Assassination is an extreme measure not normally used in clandestine operations. It should be assumed that it will never be ordered or authorized by any U.S. Headquarters, though the latter may in rare instances agree to its execution by members of an associated foreign service. This reticence is partly due to the necessity for committing communications to paper. No assassination instructions should ever be written or recorded. Consequently, the decision to employ this technique must nearly always be reached in the field, at the area where the act will take place. Decision and instructions should be confined to an absolute minimum of persons. Ideally, only one person will be involved. No report may be made, but usually the act will be properly covered by normal news services, whose output is available to all concerned.

JUSTIFICATION

Murder is not morally justifiable. Self-defense may be argued if the victim has knowledge which may destroy the resistance organization if divulged. Assassination of persons responsible for atrocities or reprisals may be regarded as just punishment. Killing a political leader whose burgeoning career is a clear and present danger to the cause of freedom may be held necessary.

But assassination can seldom be employed with a clear conscience. Persons who are morally squeamish should not attempt it.

CLASSIFICATIONS

The techniques employed will vary according to whether the subject is unaware of his danger, aware but unguarded, or guarded. They will also be affected by whether or not the assassin is to be killed with the subject. Hereafter, assassinations in which the subject is unaware will be termed "simple"; those where the subject is aware but unguarded will be termed "chase"; those where the victim is guarded will be termed "guarded."

If the assassin is to die with the subject, the act will be called "lost." If the assassin is to escape, the adjective will be "safe." It should be noted that no compromises should exist here. The assassin must not fall alive into enemy hands.

A further type division is caused by the need to conceal the fact that the subject was actually the victim of assassination, rather than an accident or natural causes. If such concealment is desirable the operation will be called "secret"; if concealment is immaterial, the act will be called "open"; while if the assassination requires publicity to be effective it will be termed "terroristic."

Following these definitions, the assassination of Julius Caesar was safe, simple, and terroristic, while that of Huey Long was lost, guarded and open. Obviously, successful secret assassinations are not recorded as assassination at all. [*Illeg*] of Thailand and Augustus Caesar may have been the victims of safe, guarded and secret assassination. Chase assassinations usually involve clandestine agents or members of criminal organizations.

THE ASSASSIN

In safe assassinations, the assassin needs the usual qualities of a clandestine agent. He should be determined, courageous, intelligent, resourceful, and physically active. If special equipment is to be used, such as firearms or drugs, it is clear that he must have outstanding skill with such equipment.

Except in terroristic assassinations, it is desirable that the assassin be transient in the area. He should have an absolute minimum of contact with the rest of the organization and his instructions should be given orally by one person only. His safe evacuation after the act is absolutely essential, but here again contact should be as limited as possible. It is preferable that the person issuing instructions also conduct any withdrawal or covering action which may be necessary.

In lost assassination, the assassin must be a fanatic of some sort. Politics, religion, and revenge are about the only feasible motives. Since a fanatic is unstable psychologically, he must be handled with extreme care. He must not know the identities of the other members of the organization, for although it is intended that he die in the act, something may go wrong. While the assassin of Trotsky has never revealed any significant information, it was unsound to depend on this when the act was planned.

PLANNING

When the decision to assassinate has been reached, the tactics of the operation must be planned, based upon an estimate of the situation similar to that used in military operations. The preliminary estimate will reveal gaps in information and possibly indicate a need for special equipment which must be procured or constructed. When all necessary data has been collected, an effective tactical plan can be prepared. All planning must be mental; no papers should ever contain evidence of the operation.

In resistance situations, assassination may be used as a counter-reprisal. Since this requires advertising to be effective, the resistance organization must be in a position to warn high officials publicly that their lives will be the price of reprisal action against innocent people. Such a threat is of no value unless it can be carried out, so it may be necessary to plan the assassination of various responsible officers of the oppressive regime and hold such plans in readiness to be used only if provoked by excessive brutality. Such plans must be modified frequently to meet changes in the tactical situation.

TECHNIQUES

The essential point of assassination is the death of the subject. A human being may be killed in many ways but sureness is often overlooked by those who may be emotionally unstrung by the seriousness of this act they intend to commit. The specific technique employed will depend upon a large number of variables, but should be constant in one point: Death must be absolutely certain. The attempt on Hitler's life failed because the conspiracy did not give this matter proper attention.

Techniques may be considered as follows:

1. Manual.
It is possible to kill a man with the bare hands, but very few are skillful enough to do it well. Even a highly trained Judo expert will hesitate to risk killing by hand unless he has absolutely no alternative.

However, the simplest local tools are often much the most efficient means of assassination. A hammer, axe, wrench, screw driver, fire poker, kitchen knife, lamp stand, or anything hard, heavy and handy will suffice. A length of rope or wire or a belt will do if the assassin is strong and agile. All such improvised weapons have the important advantage of availability and apparent innocence. The obviously lethal machine gun failed to kill Trotsky where an item of sporting goods succeeded.

In all safe cases where the assassin may be subject to search, either before or after the act, specialized weapons should not be used. Even in the lost case, the assassin may accidentally be searched before the act and should not carry an incriminating device if any sort of lethal weapon can be improvised at or near the site. If the assassin normally carries weapons because of the nature of his job, it may still be desirable to improvise and implement at the scene to avoid disclosure of his identity.

2. Accidents.
For secret assassination, either simple or chase, the contrived accident is the most effective technique. When successfully executed, it causes little excitement and is only casually investigated.

The most efficient accident, in simple assassination, is a fall of 75 feet or more onto a hard surface. Elevator shafts, stair wells, unscreened windows and bridges will serve. Bridge falls into water are not reliable. In simple cases a private meeting with the subject may be arranged at a properly-cased location. The act may be executed by sudden, vigorous [*excised*] of the ankles, tipping the subject over the edge. If the assassin immediately sets up an outcry, playing the "horrified witness", no alibi or surreptitious withdrawal is necessary. In chase cases it will usually be necessary to stun or drug the subject before dropping him. Care is required to ensure that no wound or condition not attributable to the fall is discernible after death.

Falls into the sea or swiftly flowing rivers may suffice if the subject cannot swim. It will be more reliable if the assassin can arrange to attempt rescue, as he can thus be sure of the subject's death and at the same time establish a workable alibi.

If the subject's personal habits make it feasible, alcohol may be used [*2 words excised*] to prepare him for a contrived accident of any kind.

Falls before trains or subway cars are usually effective, but require exact timing and can seldom be free from unexpected observation.

Automobile accidents are a less satisfactory means of assassination. If the subject is deliberately run down, very exact timing is necessary and

investigation is likely to be thorough. If the subject's car is tampered with, reliability is very low. The subject may be stunned or drugged and then placed in the car, but this is only reliable when the car can be run off a high cliff or into deep water without observation.

Arson can cause accidental death if the subject is drugged and left in a burning building. Reliability is not satisfactory unless the building is isolated and highly combustible.

3. Drugs.
In all types of assassination except terroristic, drugs can be very effective. If the assassin is trained as a doctor or nurse and the subject is under medical care, this is an easy and rare method. An overdose of morphine administered as a sedative will cause death without disturbance and is difficult to detect. The size of the dose will depend upon whether the subject has been using narcotics regularly. If not, two grains will suffice.

If the subject drinks heavily, morphine or a similar narcotic can be injected at the passing out stage, and the cause of death will often be held to be acute alcoholism.

Specific poisons, such as arsenic or strychine, are effective but their possession or procurement is incriminating, and accurate dosage is problematical. Poison was used unsuccessfully in the assassination of Rasputin and Kolohan, though the latter case is more accurately described as a murder.

4. Edge Weapons.
Any locally obtained edge device may be successfully employed. A certain minimum of anatomical knowledge is needed for reliability.

Puncture wounds of the body cavity may not be reliable unless the heart is reached. The heart is protected by the rib cage and is not always easy to locate.

Abdominal wounds were once nearly always mortal, but modern medical treatment has made this no longer true.

Absolute reliability is obtained by severing the spinal cord in the cervical region. This can be done with the point of a knife or a light blow of an axe or hatchet.

Another reliable method is the severing of both jugular and carotid blood vessels on both sides of the windpipe.

If the subject has been rendered unconscious by other wounds or drugs, either of the above methods can be used to ensure death.

5. Blunt Weapons.
As with edge weapons, blunt weapons require some anatomical knowledge for effective use. Their main advantage is their universal availability. A hammer may be picked up almost anywhere in the world. Baseball and [*illeg*] bats are very widely distributed. Even a rock or a heavy stick will do, and nothing resembling a weapon need be procured, carried or subsequently disposed of.

Blows should be directed to the temple, the area just below and behind the ear, and the lower, rear portion of the skull. Of course, if the blow is very heavy, any portion of the upper skull will do. The lower frontal portion of the head, from the eyes to the throat, can withstand enormous blows without fatal consequences.

6. Firearms.
Firearms are often used in assassination, often very ineffectively. The assassin usually has insufficient technical knowledge of the limitations of weapons, and expects more range, accuracy and killing power than can be provided with reliability. Since certainty of death is the major requirement, firearms should be used which can provide destructive power at least 100% in excess of that thought to be necessary, and ranges should be half that considered practical for the weapon.

Firearms have other drawbacks. Their possession is often incriminating. They may be difficult to obtain. They require a degree of experience from the user. They are [*illeg*]. Their [*illeg*] is consistently over-rated.

However, there are many cases in which firearms are probably more efficient than any other means. These cases usually involve distance between the assassin and the subject, or comparative physical weakness of the assassin, as with a woman.

(a) The precision rifle.
In guarded assassination, a good hunting or target rifle should always be considered as a possibility. Absolute reliability can nearly always be achieved at a distance of one hundred yards. In ideal circumstances, the range may be extended to 250 yards.

The rifle should be a well made bolt or falling block action type, handling a powerful long-range cartridge. The .300 F.A.B. Magnum is probably the best cartridge readily available. Other excellent calibers are . 375 M.[*illeg*]. Magnum, .270 Winchester, .30 - 106 p.s., 8 x 60 MM Magnum, 9.3 x 62 kk

and others of this type. These are preferable to ordinary military calibers, since ammunition available for them is usually of the expanding bullet type, whereas most ammunition for military rifles is full jacketed and hence not sufficiently lethal. Military ammunition should not be altered by filing or drilling bullets, as this will adversely affect accuracy.

The rifle may be of the "bull gun" variety, with extra heavy barrel and set triggers, but in any case should be capable of maximum precision. Ideally, the weapon should be able to group in one inch at one hundred yards, but 2 1/2" groups are adequate. The sight should be telescopic, not only for accuracy, but because such a sight is much better in dim light or near darkness. As long as the bare outline of the target is discernable, a telescope sight will work, even if the rifle and shooter are in total darkness.

An expanding, hunting bullet of such calibers as described above will produce extravagant laceration and shock at short or mid-range. If a man is struck just once in the body cavity, his death is almost entirely certain.

Public figures or guarded officials may be killed with great reliability and some safety if a firing point can be established prior to an official occasion. The propaganda value of this system may be very high.

(b) The machine gun.
Machine guns may be used in most cases where the precision rifle is applicable. Usually, this will require the subversion of a unit of an official guard at a ceremony, though a skillful and determined team might conceivably dispose of a loyal gun crew without commotion and take over the gun at the critical time.

The area fire capacity of the machine gun should not be used to search out a concealed subject. This was tried with predictable lack of success on Trotsky. The automatic feature of the machine gun should rather be used to increase reliability by placing a 5 second burst on the subject. Even with full jacket ammunition, this will be absolute lethal is the burst pattern is no larger than a man. This can be accomplished at about 150 yards. In ideal circumstances, a properly padded and targeted machine gun can do it at 850 yards. The major difficulty is placing the first burst exactly on the target, as most machine gunners are trained to spot their fire on target by observation of strike. This will not do in assassination as the subject will not wait.

(c) The Submachine Gun.
This weapon, known as the "machine-pistol" by the Russians and Germans and "machine-carbine" by the British, is occasionally useful in assassination. Unlike the rifle and machine gun, this is a short range weapon and since it fires pistol ammunition, much less powerful.

To be reliable, it should deliver at least 5 rounds into the subject's chest, though the .45 caliber U.S. weapons have a much larger margin of killing efficiency than the 9 mm European arms.

The assassination range of the sub-machine gun is point blank. While accurate single rounds can be delivered by sub-machine gunners at 50 yards or more, this is not certain enough for assassination. Under ordinary circumstances, the SMG should be used as a fully automatic weapon. In the hands of a capable gunner, a high cyclic rate is a distinct advantage, as speed of execution is most desirable, particularly in the case of multiple subjects.

The sub-machine gun is especially adapted to indoor work when more than one subject is to be assassinated. An effective technique has been devised for the use of a pair of sub-machine gunners, by which a room containing as many as a dozen subjects can be "purified" in about twenty seconds with little or no risk to the gunners. It is illustrated below.

While the U.S. sub-machine guns fire the most lethal cartridges, the higher cyclic rate of some foreign weapons enable the gunner to cover a target quicker with acceptable pattern density. The Bergmann Model 1934 is particularly good in this way. The Danish Madsen SMG has a moderately good cyclic rate and is admirably compact and concealable. The Russian SHGs have a good cyclic rate, but are handicapped by a small, light projectile which requires more hits for equivalent killing effect.

(d) The Shotgun.
A large bore shotgun is a most effective killing instrument as long as the range is kept under ten yards. It should normally be used only on single targets as it cannot sustain fire successfully.The barrel may be "sawed" off for convenience, but this is not a significant factor in its killing performance.

Its optimum range is just out of reach of the subject. 00 buckshot is considered the best shot size for a twelve gauge gun, but anything from single balls to bird shot will do if the range is right. The assassin should aim for the solar plexus as the shot pattern is small at close range and can easily [*illeg*] the head.

(e) The Pistol.
While the handgun is quite inefficient as a weapon of assassination, it is often used, partly because it is readily available and can be concealed on the person, and partly because its limitations are not widely appreciated. While many well known assassinations have been carried out with pistols (Lincoln, Harding, Ghandi), such attempts fail as often as they succeed, (Truman, Roosevelt, Churchill).

If a pistol is used, it should be as powerful as possible and fired from just beyond reach. The pistol and the shotgun are used in similar tactical situations, except that the shotgun is much more lethal and the pistol is much more easily concealed. In the hands of an expert, a powerful pistol is quite deadly, but such experts are rare and not usually available for assassination missions.

.45 Colt, .44 Special, .455 Kly, .45 A.S.[*illeg*] (U.S. Service) and .357 Magnum are all efficient calibers.

Less powerful rounds can suffice but are less reliable. Sub-power cartridges such as the .32s and .25s should be avoided.

In all cases, the subject should be hit solidly at least three times for complete reliability.

(f) Silent Firearms.
The sound of the explosion of the propellant in a firearm can be effectively silenced by appropriate attachments. However, the sound of the projectile passing through the air cannot, since this sound is generated outside the weapon. In cases where the velocity of the bullet greatly exceeds that of sound, the noise so generated is much louder than that of the explosion. Since all powerful rifles have muzzle velocities of over 2000 feet per second, they cannot be silenced.

Pistol bullets, on the other hand, usually travel slower than sound and the sound of their flight is negligible. Therefore, pistols, submachine guns and any sort of improvised carbine or rifle which will take a low velocity cartridge can be silenced. The user should not forget that the sound of the operation of a repeating action is considerable, and that the sound of bullet strike, particularly in bone, is quite loud.

Silent firearms are only occasionally useful to the assassin, though they have been widely publicized in this connection. Because permissible velocity is low, effective precision range is held to about 100 yards with rifle or carbine type weapons, while with pistols, silent or otherwise, are most efficient just beyond arms length. The silent feature attempts to provide a degree of safety to the assassin, but mere possession of a silent firearm is likely to create enough hazard to counter the advantage of its silence. The silent pistol combines the disadvantages of any pistol with the added one of its obviously clandestine purpose.

A telescopically sighted, closed-action carbine shooting a low velocity bullet of great weight, and built for accuracy, could be very useful to an assassin in certain situations. At the time of writing, no such weapon is known to exist.

7. Explosives.
Bombs and demolition charges of various sorts have been used frequently in assassination. Such devices, in terroristic and open assassination, can provide safety and overcome guard barriers, but it is curious that bombs have often been the implement of lost assassinations.

The major factor which affects reliability is the use of explosives for assassination. The charge must be very large and the detonation must be controlled exactly as to time by the assassin who can observe the subject. A small or moderate explosive charge is highly unreliable as a cause of death, and time delay or booby-trap devices are extremely prone to kill the wrong man. In addition to the moral aspects of indiscriminate killing, the death of casual bystanders can often produce public reactions unfavorable to the cause for which the assassination is carried out.

Bombs or grenades should never be thrown at a subject. While this will always cause a commotion and may even result in the subject's death, it is sloppy, unreliable, and bad propaganda. The charge must be too small and the assassin is never sure of: (1) reaching his attack position, (2) placing the charge close enough to the target and (3) firing the charge at the right time.

Placing the charge surreptitiously in advance permits a charge of proper size to be employed, but requires accurate prediction of the subject's movements.

Ten pounds of high explosive should normally be regarded as a minimum, and this is explosive of fragmentation material. The latter can consist of any hard, [*illeg*] material as long as the fragments are large enough. Metal or rock fragments should be walnut-size rather than pen-size. If solid plates are used, to be ruptured by the explosion, cast iron, 1" thick, gives excellent fragmentation. Military or commercial high explosives are practical for use in assassination. Homemade or improvised explosives should be avoided. While possibly powerful, they tend to be dangerous and unreliable. Antipersonnel explosive missiles are excellent, provided the assassin has sufficient technical knowledge to fuse them properly. 81 or 82 mm mortar shells, or the 120 mm mortar shell, are particularly good. Antipersonnel shells for 85, 88, 90, 100 and 105 mm guns and howitzers are both large enough to be completely reliable and small enough to be carried by one man.

The charge should be so placed that the subject is not ever six feet from it at the moment of detonation.

A large, shaped charge with the [*illeg*] filled with iron fragments (such as 1" nuts and bolts) will fire a highly lethal shotgun-type [*illeg*] to 50 yards. This reaction has not been thoroughly tested, however, and an exact replica of the proposed device should be fired in advance to determine exact range,

pattern-size, and penetration of fragments. Fragments should penetrate at least 1" of seasoned pine or equivalent for minimum reliability.

Any firing device may be used which permits exact control by the assassin. An ordinary commercial or military exploder is efficient, as long as it is rigged for instantaneous action with no time fuse in the system.

The wise [*illeg*] electric target can serve as the triggering device and provide exact timing from as far away as the assassin can reliably hit the target. This will avoid the disadvantages of stringing wire between the proposed positions of the assassin and the subject, and also permit the assassin to fire the charge from a variety of possible positions.

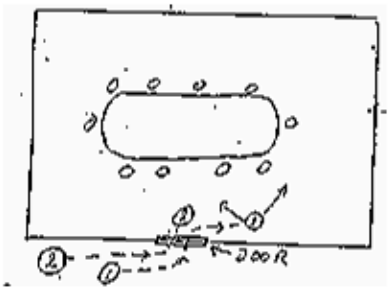
The radio switch can be [*illeg*] to fire [*illeg*], though its reliability is somewhat lower and its procurement may not be easy.

EXAMPLES

[*Illeg*] may be presented brief outlines, with critical evaluations of the following assassinations and attempts:

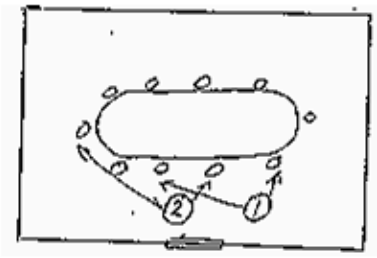
Marat
Lincoln
Harding
Grand Duke Sergei
Pirhivie
Archduke Francis
Rasputin
Madero
Kirov
Huey Long
Alexander of Yugoslavia
Trotsky
Heydrich
Hitler
Roosevelt
Truman
Mussolini
Ferdinand Benes
Aung Sang
[*illeg*]
Abdullah
Ghandi [*sic*]

CONFERENCE ROOM TECHNIQUE



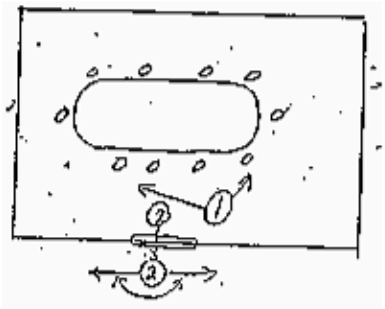
1.
(1) Enters room quickly but quietly

(2) Stands in doorway



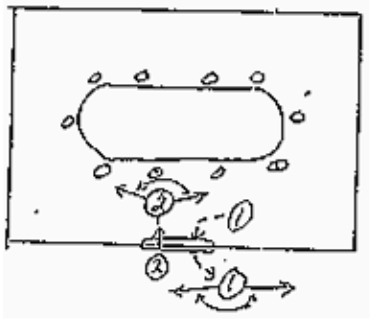
2.
(2) Opens fire on first subject to react. Swings across group toward center of mass. Times burst to empty magazine at end of swing.

(1) Covers group to prevent individual dangerous reactions; if necessary, fires individual bursts of 3 rounds.



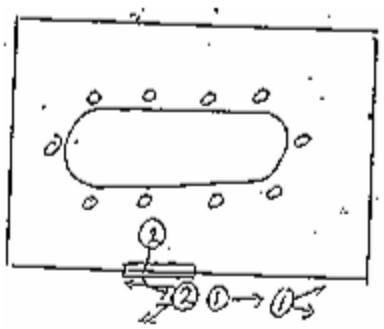
3.
(2) Finishes burst. Commands "shift." Drops back thru [*sic*] door. Replaces empty magazine. Covers corridor.

(1) On command "shift", opens fire on opposite side of target, swings one burst across group.



4.
(1) Finishes burst. Commands "shift". Drops back thru [*sic*] door. Replaces magazine. Covers corridor.

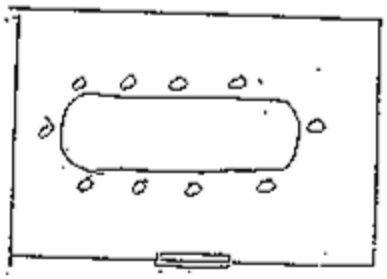
(2) On command "shift", re-enters room. Covers group: kills survivors with two-round bursts. Leaves propaganda.



5.

(2) Leaves room. Commands "GO". Covers rear with nearly full magazine.

(1) On command "GO", leads withdrawal, covering front with full magazine.



6.

Reflections on Assassination

The killing of Brian Thompson by left leaning impotent idiot Luigi Mangione is a text book example of how NOT to perform an assassination.

Firstly he used a gun with 3D printed parts. And that is not in of itself wrong. But using a real gun should always be preferred. As we saw the gun jammed at the crucial moment. As 3D printed guns do work but are less reliable than real guns.
But the gun did kill the victim and was the smallest of his mistakes.

The killer visited several fast food places right before the murder without a face mask. This is incredibly stupid especially since he wore the same clothing as he did when performing the murder.
Only wearing a corona face mask at the murder but not prior or after is incredibly unnecessary and stupid. Ideally you would order home delivery or wear a mask if you need to eat prior to the killing. Or at least use different clothing prior and after the killing.

Another mistake was to carry the weapon on him and an unusual amount of money after the murder. You should ideally throw away the gun as quickly as possible, being sure there's no serial number, DNA or fingerprints on it.
This is normally done in rivers. But you can also just put the gun in a plastic bag and throw it in a trash can.
And he should have definitely thrown the gun since it was 3D printed. It likely had no serial number to begin with. And it is not an expensive weapon to replace.

He also traveled by train and public transportation rather than using his own can which obviously is public documentation placing him there.

The only good aspects was the ability to track the victim down, and that he used an electric kick bike to quickly get away from the scene of the murder.
Russian assassins have used bicycles in the past to kill people and quickly get away.

What we can learn is that, an assassination is much better performed by:

Having two sets of clothes. One for traveling and one for the murder. Both do include gloves, corona face mask and sunglasses.

Travelling by car, and having a bicycle with you. Ideally use stolen registration plates.

Bringing your own food, or ordering home delivery to the motel/hotel you stay at with a burner phone.

Always wear a corona face mask and sunglasses when in town.
Park the car away from the scene of the crime.

Kill the victim using a real gun (with no serial number, and cleaned for DNA and finger prints), and ride away in a bicycle to the car.

Switch clothing and drive away.

Drive to a river, put the stolen registration plates, murder clothing and gun in a plastic bag, along with a large rock, and throw it in the river. And then put your own registration plates on.
Before driving home.

Having a prepared alibi is also good.

If police come to arrest you, you use your right to remain silent and ask for an attorney.

Electronic Warfare

Signal Jamming and Signal Jammers

These are radios that send radio signals and can be used to disrupt or jam other radio signals. The idea is that the receiver will hear the strongest signal, and so if you are able to send a stronger signal on the same frequency, then the receiver will hear your signal.

This has been used to disrupt radio signals from tv stations to spread propaganda. This has been done by setting up a strong radio close to the tv stations satellite dish, and then start sending a stronger signal at the same frequency than the satellite dish does.

These signals also don't need to send video or audio information to display propaganda. Rather this can also just send scrambled information which becomes white noise for the receiver.

But if the goal is to simply disrupt the broadcast, then you can also just vandalize the satellite dishes. Destroying the satellite dishes is something which will disrupt the broadcast much longer.

To find the right frequency you can simply google it, or use chatgpt, to help find the frequency that the radio or tv station uses.
Police radio frequencies are also publicly listed. And so you can also disrupt police radio communication with these tools.

You could also send strong radio signals at the same frequency at different places not close to the tv station. But notice that this will only have a local effect.
But the advantage is that the farther you are from the tv station, the weaker the signal the tv station sends. Thus the weaker the signal you use can be.
So you could for example:
Disrupt the tv station signal over a certain town or city, by overpowering the signal at the frequency, by broadcasting at that local place.
Notice you could also disrupt the police communications in a town in conjunction with a crime. It would definitely sabotage police efforts if their radio communication was jammed, while your group was robbing a truck.

But if you want to over shadow all the broadcast from a tv station you need to place your signal sender close to theirs, and broadcast with a much stronger signal.

Police Scanners

As mentioned you can simply look up on the internet the police radio frequencies. This means that with a radio you can disrupt or listen to the radio signals.
Both of which are illegal. Disrupting the signals, but also to listen to the police communications.
This is one of the reasons that police communicate using code, so that potential listeners won't understand.

But if you want to listen to police communications, for example to notice when they are alerted of a crime:
You first look up the frequency, and then tune the radio and simply listen.
I suggest being somewhat familiar with the code that the police use in your country, which is something you likely can look up as well.

This is suitable if your group is committing a crime which takes a long time, like a jewelry robbery. The get-away driver can sit in the car ready to drive away, and while the crime is being committed he can sit and listen to the police radio.
And if he hears them describing a robbery with a description that fits your group, then he can alert the others.

Femtocell (mini cell tower/mini stingray phone tracker, acts as a middle man for the traffic between the phone and the cell tower, can be used to wiretap/eavesdrop calls, read sms and messages, or just harness the traffic information, including internet information)

Femtocells are devices that can function as wiretapping devices. They assume the role of a middle man for digital communication, and can thus receive the communication information between two parties.
It is essentially a very small cell tower. It can handle radio and digital signals.
But notice that these only work on a much smaller distance. Around 50 meters usually.
And these can be used to wiretap or listen on mobile information.

Femtocells can be purchased online. But you want to look for "Stingray (IMSI catcher)", the stingray models are rogue and illegally programmed versions meant to decrypt and listen in on mobile calls.

Legal Proceedings

Legal Rights

These are rights that you should always be aware of because they always apply. And many criminals hurt their own case by not using their rights.

Right to Remain Silent

This is listed first because it is the most basic and effective right to not hurt your own case, and many criminals simply don't use it for no good reason.

Many criminals brag or discuss their illegal activity with friends, family and even online. Which is sometimes why they are caught.
And some criminals think or are tricked into thinking that they can talk their way out of it in an interrogation. And instead just offer the police a bunch of useful information against themselves.
Remember pride is a sin, humility is a virtue.

Never talk to the police. It is that simple. Whenever the police ask you questions, always use your right to remain silent. Never volunteer information.

The police have interrogation techniques and withhold information to make you think that you are not a suspect.
They won't tell you what they know and don't know. But instead will ask you to tell your version of what happened. Because you either give incriminating evidence for free, or you will lie in a way that they can prove.
They only then confront you. When they make you testify something is not true, and they have evidence against it. And then they ask you to continue testifying.

You should trust them if they make it sound like you are not the suspect, or they just wanna figure out what happened because you might have seen who might have done it.

Always say "I use my right to remain silent. Whenever you interact with police.
And then just remain silent.

There's one exception when you are not allowed to remain silent and that is under immunity. But that happens usually in a trial. The prosecutor will provide immunity, which means you are forced to testify, and whatever you say cannot be used to incriminate you.
So the only time you are forced to testify is when it cannot incriminate you.

But this is something your lawyer will explain to you if it were to happen.

Otherwise just use your right to remain silent.

Right to Counsel

You can always ask to speak to an attorney. Now in some places you always have a right to a public defender. Which is a lawyer that is assigned to you by the state and paid for you by the state.
But in some places it depends on whether you can afford a lawyer or not.

So if you are in a situation where you cannot afford a lawyer, or simply want to speak to a lawyer, then ask to speak to a lawyer.

Which you could say is always, when the police are going to arrest you.

If you are being taken into custody, you always use your right to remain silent, and you always use your right to speak to an attorney.

You want to speak to an attorney because he can professionally ask the police why you're being arrested and what has happened, etc.
So you don’t have to pretend to be a lawyer and try and talk your way out with the police. Instead you always ask to remain silent, and ask for an attorney for help.

Confidentiality and Professional Secrecy

These are communications that are legally protected from being disclosed or asked about. And this usually only applies to:
Lawyers, priests and spouses.

Communication with your lawyer has "attorney client privilege” which means it cannot be asked about in trial or any other setting.
This means you always can discuss anything about your case with your lawyer without being worried that it can be used against you.

Priests have professional secrecy in regards to confessions. So you can always confess your sins to your priest without being worried it could be used against you.

Lastly, some places have what’s called “spousal privilege”. And that is a wife or husband cannot be called upon to testify against their own spouse, and thus effectively you could say anything about a crime to them.

But notice the spouse can often volunteer information if they want. They cannot be forced to, but they can. So you need to trust that your spouse wouldn't. And make sure to look up if this law applies where you live.

Absolute right to testify and absolute right not to testify

This allows you under a trial to decide on your own whether you testify or not. You cannot be forced to testify, and you can always have the option to testify.
Meaning not even your lawyer can stop you from testifying or force you to.

But you should listen to your lawyer. Usually you don't want to testify, but if your lawyer says that it is going to help your case then you should.

So the default is to not testify, which you have an absolute right not to.
And you only decide to testify if your lawyer says it is worth it. Thus you don't testify without being sure whether it is good or bad for your case.

Pre-trial Investigation and Custody

What to do and not do before a trial.

There's non-custodial interrogation, and custodial interrogation. Basically settings where the police put you in a room and ask you questions regarding some case.
For these you should always use your right to remain silent. It doesn't matter what they say.

For non-custodial interrogations and before arrest they might ask you questions without mentioning you have the right to remain silent.
But you absolutely do still have the right to remain silent. So it doesn't matter what the police say, or when they ask you questions, you always use your right to remain silent.

Polygraphs or lie-detector tests are very rarely used and even more rarely admitted as evidence.
It is said that lie-detector tests are 80-90% accurate in detecting honest or dishonest answers, which is not true, it is just an attempt to stress the suspect. In fact the legal system does not allow polygraphs in most cases because they are too unpredictable.

In the case that you are asked to do a polygraph then simply refuse. You cannot be forced to do a polygraph test.
If for whatever reason they insist on it, consult your lawyer for advice.
In practice polygraphs are usually just used to stress the suspect into admitting or changing their story.
The results always come back as a “fail” (whatever that means) irrespective if it says you lied or not.
They are just trying to trick you into thinking they have caught you lying.

While being in custody the police are going to observe you. This means even when you are in your cell or on the phone they can still draw information about you.
First the jailhouse phone is not private, they can absolutely use what you say on it against you in trial. So don’t say anything regarding the crime on the jailhouse phone (it is only good to ask someone to post bail).
Secondly it is very common that a criminal talks about their crime with their jail inmates. And then the authorities ask the inmates to provide the information, in exchange for a deal.

So basically:
1 Whenever talking to police, use your right to remain silent.
2 Do not agree to any polygraphs.
3 Do not discuss the crime with other inmates. “You don’t want to talk about it.”
4 Don’t discuss the crime over the jailhouse phone.
5 Always ask for an attorney and only discuss the crime with him when he says it is ok.

Trials

Plea deals are sometimes the best way to go. You should listen to your lawyer. Your lawyer sometimes has the best realistic estimate if you would be found guilty in trial or not. And so a plea deal where you get less time for pleading guilty immediately may be the right way to go.
Always listen to your lawyer.
Unless you are in a criminal organisation and you have an agreement not to plead guilty because it will risk hurting the entire organisation.

If it goes to trial, you should know that immunity can be offered to witnesses. This means that a person is forced to testify but nothing can be used against the witness.
But the testimony can be used against the accused.
This way the state forces members in a criminal organisation to testify against themselves.
The best way to deal with this is for the witness to say they do a lot of drugs, that way it makes sense for them to say that they don’t remember anything.
When forced to testify you have to answer “yes”, “no” or “I don’t know”. And it makes it easy to answer “I don’t know” on all the important questions by appealing to drug abuse and thus no clear memory of anything.

There are generally three outcomes to a trial; guilty, innocent or mistrial.
In countries like the US the jury has the full power over the decision, thus one can appeal to “jury nullification”. This is when the jury knowingly declares someone innocent even though they are clearly guilty, they nullify the law.
I would recommend if possible, that you as a defendant, at least mention this in trial once. Especially if there’s any political or similar motivation that could sway the jury.
But notice it is absolutely forbidden for your lawyer to mention this in court, and they could be punished for it. But you as a defendant can keep doing it. And the court can at most tell the jurors to ignore it.

Otherwise for most countries there are certain events which would automatically trigger a mistrial. This would be for example if an important person in the trial died.
For example if the defendant, prosecutor, judge, juror, etc died, this would likely automatically trigger a mistrial. And if lucky the case won’t or can’t be re-tried.

This is part of the reason why cameras are not allowed in court. Because photographing the jury could potentially endanger them. They can now be manipulated (bribed, threatened) or killed.

So if you have people on the outside. All that is needed is to sneak photograph the jury with a secret camera in court. And then your people on the outside can kill one or more, and trigger a mistrial.

I have therefore constructed some strategies:

Passive, Safe and Easiest Strategy

Use your right to remain silent and ask to speak to an attorney.
Depending on the circumstances the authorities have certain rights to search your property and arrest you.
Take any plea deal you can.
Generally the best thing is to comply, meaning not resist arrest or any searches. But you are under no obligation to answer any questions. And you should not, unless your attorney thinks it is in your interest.

Don’t resist, lie or tamper with anything. Once you are being investigated, the best thing is to not provide anything more than that which they have a right to access. Meaning remain silent, you have an absolute right to remain silent. Secondly you should ask to speak with an attorney, if you have not or cannot afford one, you will be provided one. The attorney knows more about the law and court proceedings than you and will help you devise a defense strategy.

Risky and Desperate Strategy

This involves lying, having others lie, not taking any deals, doing anything hoping to convince the jury for an innocent verdict.

There are very few times you can provide information without the possibility of it being used against you in a trial. Sometimes it has to do with your rights being violated. Sometimes it has to do with an immunity deal, whereby your information in a given medium cannot be used against you,
Most of the time what you say or do can be used against you, and the authorities do not always need to tell you that. If you're arrested they will read you your Miranda rights. But if you're asked to be interviewed by the police, they will not tell you your miranda rights, and they won't tell you the conversation is recorded, and that it can be used against you later.

It is therefore risky to try and lie and "wing it". Because everything you say can and will be analyzed later and if there are inconsistencies the prosecution will show them to a jury.
The story needs to be consistent, reasonable and believable. And the easiest way to build a good story, is to keep it simple and not try to explain everything.

Many criminals are caught or help the case against them with admissions all the time. Interrogation techniques do work.
Many criminals don't practice their lie and tell many different people different stories that are contrived and convoluted to explain something. And all of it can be found by the police who will interview the people close to you or associated with you, and they will most likely provide information on you.
Then they will interview you knowing all the facts and statements surrounding the case, and have you try and explain everything again. And they will let you keep going until you start saying inconsistent things. They will have you double down on a story they know is false, and then show one inconsistency to force you to change the story, and then they'll repeat the process, forcing you to change the story however many times is needed to make it work. With high likelihood of extracting an admission in the process.
Many criminals admit to their crimes without even realizing it. They'll go from saying "I did not poison him" to saying "yes I did give him the poison but I didn't think it was gonna kill him", thinking something like that does not count as an admission.

The best way to lie is not to do it at all, and remain silent. The second best way to lie, is to know as much as possible and say as little as possible.
Try to figure out what the police know before you commit yourself. And if you are unsure what to lie, the possibility exists to just say "I don't know". It sounds strange when you have an answer for literally everything.

Aggressive Strategy

With God everything is possible.
Meaning if you have enough power you can solve anything.
This is the most desperate and demanding strategy. It involves doing anything in your power to cause a mistrial or an innocent verdict.

This requires:
Manpower on the outside.
Safe communications, often done via corrupt lawyers (who can pass on messages, cannot be called to testify about it, and the messages themselves are not permitted in court).
Pictures or other info on jurors. (can also follow the juror buss if one is used)
Pictures or other info on important court figures, judge, attorneys, key witnesses, etc
Plata o Plomo, silver or lead, bribe or kill. Most desperate approach, just kill, preferably a black juror.

Prison

Race

The primacy of race is clear in life and death situations. And prison is one long life and death situation all the time.

Segregate by race. Trust your own race only. Be friendly towards your race's prison gang.
The reason for this is because it works, in fact it works the best. In evolutionary terms this is called “kin selection”. So it is natural survival instincts and behavior that works.
Meaning many people know it. And some who have had unfortunate social indoctrination, need to learn this.

In almost all prisons throughout the entire world you will find racial segregation and race based prison gangs.

The best thing you can do, when entering prison, is to go to your race, wherever they are gathered. And just introduce yourself.

What could likely happen but not always, is that people will come up to you to find out, whether you're a child molester or not (if you are, they will try to beat you to death), what race you are to tell you where to go. And if you're unlucky, you’ll be in a prison where your race is a minority, or doesn’t have a strong prison gang, and they will rob you of your stuff.

Prison Gangs

As said, all gangs are race based. Meaning there’s a prison gang for each race.
Depending on the place there may vary in the ingroup distinctions.

For example in prisons with a smaller presence of hispanics, most hispanics will be part of the white group as most hispanics are predominantly white. Or if they are big enough, they will have their own group, usually friendly towards the white group.
But because of the disorganized street war, if the hispanic group is big enough, there will usually become a split between the “northerners” and the “southerners”.
The reason has to do with an ongoing war between hispanics south of the US border and those north of the US border, to Mexico that is.

All of this is of course natural for the mixed race that hispanics are. Generally though hispanics and especially white hispanics will be closer or even part of the white group, until they are big enough to become the mixed race group.

In group distinctions only become relevant when the out group distinctions are smaller in nature. Meaning if everyone in the prison is hispanic, white or black, naturally people will not fight over race differences which are not present.
People will always fight over the biggest most concerning difference. Presence is a factor, but also the size of the difference. Thus race doesn’t need as much presence to be equal or more important than street crime differences.

Depending on where in Europe, the segregation and prison gangs are sometimes more based on nationality rather than the major races, simply because there literally is no racial variance.

For example in major nations and western europe, you’ll find prison gangs based on race, white europeans, arabs, blacks, etc.
For example in lesser nations and in eastern europe, you’ll find prison gangs based on nationality, albanian gangs, serbian gangs, croatian gangs, russian gangs, bulgarian gangs, etc.

But the same principles apply, bloodbond is most important, blood is thicker than water, the best strategy for survival is organization based on race and bloodbond.

In reality, those that work alone will be outcompeted by those who work in functioning groups, those that try to work with everyone will be outcompeted by those who work in trustworthy groups.
In reality the groups most trustworthy, reliable and synergetic are those based on genetic similarity, based on physically real similarities and differences.

Meaning groups based on race have greater yield of survival for each individual member. On average.

Thus one should embrace this or be outcompeted.

Prison Rules

Following prison rules can be summarized as:
1 Show respect; don't ask for things, don't talk out of line, don't interrupt, don't question, don't judge, don't stare, don't compromise or negotiate, don't look, don't ever smile,
2 Be strong; don't show vulnerabilities, don't ever discuss personal life/money/relationships/history, don't talk, do train and exercise, do fight back if someone attacks you, don't ever discuss your legal proceedings your going through, only ever talk about what your charged with if necessary and appropriate, hide everything you own or have as much as possible, don't ever share information about anyone, if someone calls you a bad word like bitch you have to fight right then and there just start punching him everything you can, if someone takes your things you have to fight him right then and there, if someone tells you to give up space you have to fight him right then and there,
3 Be loyal to your race; if you don't protect your those of the same race they will not protect you, if your race attacks or is attacked by another race you have to fight with your race against the other, don't ever talk to someone of another race, don't ever trade things with another race, don't ever show any kind of disloyalty to your own race, only ever show loyalty to your own race, if your race's prison gang asks you to do something you do it, be open and honest about you being ready to help your own race, showing good will might get you out of being forced to do somethings but don't expect it, if it's clear your gang wants you to do it then do it whatever it is, be around your race, train with your race, help your race, don't avoid spending time with your race, spend as much time as you can with your own race.

Fights

Fights are common, and it is important to recognize the best option is to always commit. If someone is going to fight you, you just commit and try to beat them to death immediately.
The option to run never exists.

Basically if someone cuts you in line, tells you to give up your food or stuff, takes your spot, tells you to leave the place, then you have to fight.
If they challenge you then you have to fight and should just do it no matter what.
Especially if you have befriended someone in your own race, as they can call your race to help. But they will not help you if you are not ready to fight.

Your own race will only find it reasonable to fight for you if you show that you can fight for them or when it is needed.

I highly recommend the first thing you do is make a shiv. Which is really easy to do. Sharpen a toothbrush, or part of a picket fence, anything. Put razorblades on it if possible.
And hide the weapon in your sock or in your pants.
If the fight happens, just immediately pull your shiv and try to kill them no matter what.

Entering Prison

In the cafeteria:

Stand in line, don’t take someone's spot or cut the line, when you have a spot that is yours and you will not likely be confronted about it, but if you are you have to fight.
If you receive determined portions, you take them and move on.
If you pick your own portion, don’t take too long, take alot of food, even if you don’t like it you should eat it, even if you don’t finish you could give it to someone of your own race.
Your goal is to eat and gain weight and muscles.

If you're already acquainted with someone of your race, just follow them and sit with them, or go to them and sit with them.

If you haven’t spoken to anyone, go to where your race is, and look for an empty spot, and ask “is someone sitting here?”, don’t just take the spot.

Whatever you do; don’t ever try and sit with anyone who is not your race, don’t ever look at someone who is not your race, don’t ever talk to someone who is not your race, and don’t ever share food with someone of another race.

Exercise is extremely important to keep you in shape so that you can fight if need be.
Generally you want to train in a group with your friends of the same race. Or when you're alone in your cell.
You do not and cannot go and ask someone if you could have the spot or equipment to exercise, especially if they are not of the same race as you.
You might instigate a fight right then and there if you ever ask a person of a different race for space or things.
Also when you're training alone you're to some degree exposed. You're not aware of everything around you and you might already be tired or exhausted if a fight comes.
That’s why when training outside your cell, you want to do so in a group, with others you can trust, meaning people of the same race.
When you’re in your cell and locked up, then it doesn’t matter, you can safely train alone.

Depending on the prison there might be different machines for exercise.
Prison gyms used to have free weights, but are entirely removed for the obvious reason that they were used as weapons.

If there are machines, be mindful that they are almost always occupied by the dominant group, and there is no scheduled use. If they have it they have it, you cannot ask for a spot or equipment without fighting. So to work out with machines, you basically have to be lucky and invited to do so by those who can enforce control over them.
The group who controls the machines are often looking for new recruits to help enforce their control, but they want trustworthy people, meaning not some dude who just walks up and basically asks for a hand out.
Again, the group who has some machines needs to be of your race, you need to be respectful and show yourself useful, with time you'll be allowed to sit on their side of the yard, cafeteria, etc, and you might eventually be invited to train with them.

If you do not have access to machines for whatever reason, you will have to make your own free weights and/or do pure calisthenics.
Free weights can be made by putting stuff in bags and just lifting the bags.
Pure calisthenics is also an option.

Combat Theory

This part will assume a larger group of people with access to weapons formal or improvised.

It is recommended to actually do military service for two reasons:
1 It gives inside control of important positions in the nation's army.
2 Weapons, explosives and equipment can be stolen.

The more people in the army the greater influence and insider cooperation from the army is possible. And stealing becomes more realistic.

This will detail the strategy and tactics that the fighting body of a resistance group utilizes.
Of course there is the financial sector that draws in money and resources. But this is the body that is responsible for direct confrontations and fighting the state.

This body has two purposes. And thus two modes of operation.
1 When possible the body attempts a coup d’état, a state coup. Where all the power is mobilized.
2 When too weak to attempt a coup. The body utilizes and mobilizes the necessary force to achieve certain important missions;
Defend headquarters, training grounds, supply caches, from police raids.
Raid police, military bases.

But mostly 2 involves preparing and building strength for a coup. Gathering weapons, preparing caches, training new recruits.

Military Structure and Operations

The fighting body has two modes generally:
1 Reserve system.
2 Mobilization phase.

The reserve system, as I'll call it, is when the fighting body invites recruits to receive military training.
This usually lasts a few months before they are sent back into civilian life.
This allows having a large manpool of military trained individuals, without having a large standing army.
People return to normal life and finance their civilian life.

Mobilization is when the manpool is called upon to create a large standing army.

Of course there may come certain times of need demanding partial mobilizations, where certain numbers are called upon.
As an example: The police are gathering at the entrance of a forest to raid the base your organisation has prepared.
Local manpool is immediately mobilized. And they travel into the forest and join for an armed confrontation. This allows your army to move the base and all the equipment, while the police are held back.

But then there are moments demanding full mobilization, like if your army will execute a state coup. In this case of course all of the manpool should be called upon.

I think the best way to conduct the armed branch of the criminal organisation is to have it be a deeper, more secretive layer requiring initiation.
So there would be many small criminal organisations like, fraud groups, robbery teams, etc. And when these members have committed a few crimes, they can then be called to kill an enemy (like a black) to initiate them into the deeper layer of the larger organisation.
And it begins with them being trained militarily, before returning to civilian life, with a chief role in the smaller criminal organisations.

As an example:
An initiated member of the criminal organisation starts a gym. Soon he creates a team of robbers who perform some robberies. He then tests them separately and asks to kill a test target, like a random black person.
Once they do, they can be initiated. They are informed about the larger organisation that the first member is part of.
And once, twice or thrice a year, each initiated new member is called to perform military service for the armed branch (the paramilitary) of the organisation.
But this can be skipped or shortened, if it turns out they have already done military service in the regular armed forces, (though some familiarity with the weaponry of the paramilitary is good).
And once they are complete they now can take the leading role in forming a new small criminal organisation, to find new recruits.

(large crime org) - (paramilitary branch)

| | |
(head member) - (head member) - (head member)

(small crime org) (small crime org) (small crime org)

The lines imply connection. And with this system, any new person assumed into a small crime network, does not receive any crucial information about the larger crime network or paramilitary branch.

This prevents police from joining for the sake of undercover finding out the locations and peoples involved and raiding the entire operation.
Only the head and initiated members maintain connection to the larger body. And to be initiated requires a killing which police cannot do.
In the worst case the initiated head member can be charged, but obviously he wouldn't give up any information about the larger body.

Further each member of the larger crime organisation is ready to be mobilized in a moment's notice. And so the paramilitary branch may be small, and mainly focuses on gathering weapons and equipment, and sometimes performs a lesser mission.
But if a time of need comes, then suddenly a large body can be mobilized.

I of course think this should be coupled with legal and civilian organisations subordinated by ideology as well. But that is further covered in "The Power Struggle".
The idea I'm simply trying to show is that high level trust is needed to initiate people. To have an actual paramilitary structure that actively recruits.
The absolute safest being recruiting people who can prove they are not police, and loyal, by killing.

Further the training in a reserve system is usually two part:
Basic training, covering all the basics everyone should know.
Specialisation training, covering a specific role that a person is assigned to.

But while conducting training whether in the basic or specialisation phase, this should be coupled with physical training. Ideally light training every day.

Basic Training

Uniform. How to wear different uniforms for different weathers, summer clothing, winter clothing, clothing for rain, etc.
How to tie the boots and put the tied lace behind the tongue or around the foot so it doesn't stick out.
How to wear the combat vest and helmet. And what all the pockets are for. Ammo pockets, radio pocket, dump pocket (for empty magazines), medic pocket (carrying first aid equipment), tourniquet pocket (for 1 or more tourniquets), grenade pocket, etc.

Weapon training, for the assault rifle and/or pistol, how to pick apart and maintain, and how to aim, fire, and correct the sights.

First aid training, where recruits are shown how equipment in first aid packs are used. Primarily and most importantly it is demonstrated how to use tourniquets.

The tourniquet has its own pocket and is very important to prevent bleeding in limbs.
But the medic pocket should include:
Bandages
Hemostat
Thermal camouflage blanket

Basic commands and formations.
Formations like: 3-line (3 men long and continuously filled), or 3-row (3 wide and continuously filled), etc.
The words used are not important, so the system can have whatever, just as it quickly informs how they should stand.
Also in battle the usual are either; line or row.
Line being: . . . . . (a line of soldiers)
Row being: . (a row of soldiers)
.
.

Rows are usually the marching formation. Because when you encounter the enemy then less people are exposed.
Once the enemy is found the goal is to form a line to have as many soldiers on the front as possible.

Notice, this can of course vary depending on the situation, and usually groups of soldiers are working in conjunction with other groups.
For example:
(group 1 in line) (group 2 in line)
(group 3 behind group 1 in row, covering the flank)

This would look like:
. . . . . .
.
.
.
This formation marches forwards and attacks the enemy, and covers a flank. Group 3 can then function flexibly and move to the other flank, or create another line to have three groups of lines. More on this later.
Lastly there's the basic commands: March, stop, run, cover.

Cover is the command, whereby the soldiers find good spots to hide and aim their guns at the relevant direction.
In the field this will automatically happen on every pause or stop. This allows people to piss, eat, drink water, while others protect.
Everyone protects by default and when they see that others protect they can quickly do what they need to refresh, before going back to protecting.

1 Week can be dedicated to the various weapons used in the paramilitary force, showing them. And if they are simple to use, they are also tested.

1 Week is dedicated to field exercise. Whereby recruits learn how to build tents, dig holes for defensive fortifications, and practice attacking in different formations.

A team consists of 3-4 men. When they encounter the enemy, the standard attacking tactic is to have one person moving while the others protect:
1 . . .

2 * . .

3 * * .

4 * * *

The . symbolizes the soldier at starting position, while the * symbolizes a soldier that has moved forward. As you can see when having one moving each time, you have two that always protect and fire upon the enemy.

Notice, these movements are very short, just a few seconds. And are meant to be from tree to tree basically.
A soldier hops closer and closer, doing many short sprints, rather than one long sprint. And once he has a good spot he reports it to the team leader.

The team leader directs the movement. Meaning he screams which soldier moves when. And the soldier moving does so and screams back once he has gotten a better position closer to the enemy.

It is important to remember here that the soldier doesn't just move for the sake of moving. If he can move to a better spot, then he moves to that place. Otherwise he can simply scream back at the team leader, that he can't move, or he has a good spot.

Naturally though the movement is less during combat, and when the enemy isn't visible or killed, that is when you move forward, at least more aggressively.

So naturally the behavior of a team during combat is.
1 Team encounters the enemy, and combat begins:
Everybody lays down, ideally close to some protection like a tree, and then fires at the enemy.
The team leader gives commands to move rarely, and individual soldiers improve their positions if they can.
If the team leader hears that people can't move or they have good positions then he keeps them there. He can also use his own eyes to check this.

2 Some enemies are killed, they are fewer, they hide more or try to move.
In this case the team leader orders movement, and repeats it to clarify that they must move forward. The idea being this is a good time to storm the enemy.

If more enemies show up, again making it hard to move, then the team leader does not repeat move orders, instead letting his soldiers only move if they can.

(For simplicity, you would have one command to move. Otherwise you can have two commands. One for moving if possible (move), and one for forced movement (storm).)

3 If no enemies are visible, then regular move orders are all forced. And the individual soldiers should be aware of that and move forward no matter what.

Basically when attacking the team leader wants two firing, and one moving always.
He calls out who moves when. And that soldier does a few short sprints between trees to a better position closer. Once complete or he can't move, he reports so.
The team leader fires at the enemy, sometimes checking his own soldiers placement, and how many enemies there are. Adjusting his move orders accordingly.
Fewer enemies or bad positions for your soldiers means call many move orders.
Many enemies or good positions means call fewer move orders.

And when there are no enemies, the team leader demands move/storm orders, whereby soldiers take longer leaps.

As you can tell this is something a team learns through practice and experience. Simply repeat simulating attacks until they perform it correctly.

Notice it is important not to move in front of another soldier, this can obviously lead to friendly fire and not allowing the allied soldier to shoot at the enemy.

In practice these move and fire tactics are usually not worth executing. In the beginning of combat it is often better to just the soldiers lay and fire. Having them run only creates large moving targets for the enemy.
Again the team leaders use move orders when the enemy is weak, when they are few in numbers, have worse equipment (no machine gun or not good sights or night vision goggles or something similar), or awkward position (exposed flank).
You don't use move orders against a stronger enemy, and when attacking, the defending enemy usually is stronger. Instead the goal is to attack where the enemy is weak. And that is where it is an option to use move orders to get close and storm the enemy.

So when flanking the enemy, use more move orders. When attacking directly into a strong fortified enemy, then don't try to move close using move orders.

Lastly, I think a few days should be assigned to teach people without driving licenses how to drive the vehicles the paramilitary army has.
They obviously don't need to know any rules of the road, just how to drive the vehicles, if they need to.

Specialisation training

This is where soldiers are assigned to different roles. Considering their strengths and the need of the paramilitary organisation.

Roles

Rifleman:
Regular infantry soldiers, these are men that fill the frontline.

Medic:
These carry larger medic bags, and have primary duty to help wounded soldiers.

Combat Engineers:
Soldiers mainly focusing on building or sabotaging infrastructure, defensive structures, laying or removing mines, etc.

Artillery:
Soldiers that communicate with the frontline soldiers and direct the artillery fire.

Recon:
Basically light infantry, these carry less heavy equipment, and more food, water, radios, and other equipment like: binoculars, drones, long sighted rifles, etc.
These will move in front of the front line, and seek and find the enemy, to help the regular infantry to engage the enemy.

Drivers:

These drive all sorts of vehicles, transporting ammunition, food, water, wood, and wounded soldiers. Or vehicles meant for combat.
Personnel carrying vehicles, like trucks packed with rifle men. (Motorised infantry).
Self propelled weapon systems, like artillery, mortars or rocket artillery.

Larger configurations

As I mentioned before. A team is a set of three soldiers, and they have their set of movements in a field. But normally many teams are part of and function in larger configurations.
And there are different leadership roles within them:

Team: Teamleader, viceteamleader, soldier (+ extra soldiers if designated)

Group: Groupleader, vicegroupleader, soldier, team 1, team 2, team 3,
(In a group usually one team has a machine gun, and functions are fire support allowing the other teams to move more, meaning the team with the machine gun is usually left more stationary)

Platoon: Platoonleader, viceplutonleader, medic, drone operator, soldier with extra radio group 1, group 2, group 3

Company: Companyleader, Vicecompanyleader, field doctor, soldier with extra radio, soldier with extra radio, platoon1, platoon2, platoon3.

These configurations are used for the frontline forces. And these have the communication systems to support configurations.
The platoon leader and company leader have soldiers with extra radios that communicate with the support groups. So if they need support (medical, ammunition, artillery, etc), they tell the soldier with the radio, and he places the order.
Similarly the support configurations has a man with a radio for each platoon and company.
This allows the leader for the support configuration to hear the different orders, and put them on different prioritizations before ordering what the support configuration does.

The radio communications can be set up the following way:

Groupleaders, and platoonleaders share radio channel.

The companyleader, and viceplatoonleaders share radio channel.

Each platoon and company has an extra soldier with a radio, who has a radio channel for each support configuration present.

Each support configuration has a radio operator for soldier with extra radio. One for the company, and one for each platoon.
And a leader that takes the orders and prioritizes them.

(If radio communications are broken, it makes sense for some regular soldiers to carry extra radios on them, that allows them to quickly assume the role of a leader if he is killed.)
(One option is to have a drone operator team, rather than one single drone operator, each carrying radios and 1 or more drones. In this case if a leader dies or a drone is shot down or used in a kamikaze attack, then the drone operator team can delegate soldiers accordingly.)

The Platoon Equipment

Each platoon needs 1-2 trucks to transport the soldiers and equipment.

The platoon needs:

1 tent per group, and 1 tent for the platoon leaders.
1 Heater/stove (with chimney) per tent
1-2 Shovels, axes, saws, iron pikes, steel wire, sets of toilet paper, sets of mre rations, piles of wood (for fire) per tent.
3 20L Water bottles per tent.
1-5 Extra Thermal camouflage blanket
Extra medical equipment.

With this equipment, assuming each individual soldier brings some of his own water and food, this platoon could easily last 1-2 weeks, before starting to need refills.
Though constant refills every 3 days is good.
The platoon would also be capable of preparing basic defensive fortifications.

Defensive fortifications

Requirements for a good firing fortification:

1 Wide range of fire.
2 Protection against fire, indirect fire and observations
3 Good support for the gun.
4 Protected escape route to and from the firing fortification.

The width of a physical barrier needed to protect against regular firearms:
1.5 cm Steel
20 cm Concrete
50 cm Sand in sandbags
50 cm Stone
60 cm Fresh Tree
100 cm Regular dirt
150 cm Tightly packed snow
300 cm Untouched snow

Of course having an even wider barrier is of course good.

These demonstrate the basic idea. They are dug into the ground protecting the shooter from direct and indirect fire, while offering good support for the weapon, a wide range of fire.
But usually you would want a layer above the head where you intend to shoot from.

These show more appropriate roofs, and the escape roots from the positions.
Usually these firing positions are dug on top of hills, so when retreating, you are retreating downhill on the opposite side from the enemy. And you naturally have a lot of protection.

Trenches in the ukraine-russian conflict during winters and rain get filled with water. And they had to rediscover from ww1 that using wooden pallets can be used to create distance between the ground and where people walk.
That way water is built up beneath where people walk.

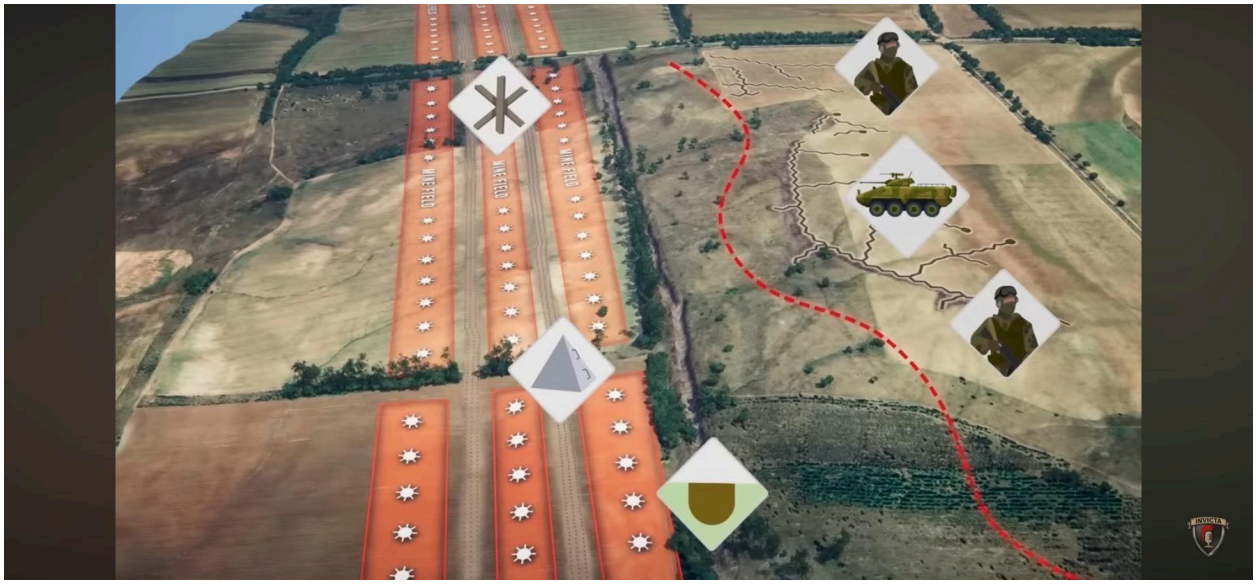
Defensive fortifications should be prepared with several lines. A first, second or even third line With lines covering flanks as well.
This allows soldiers to retreat or cover flanks on the battlefield if the first line is about to fail.

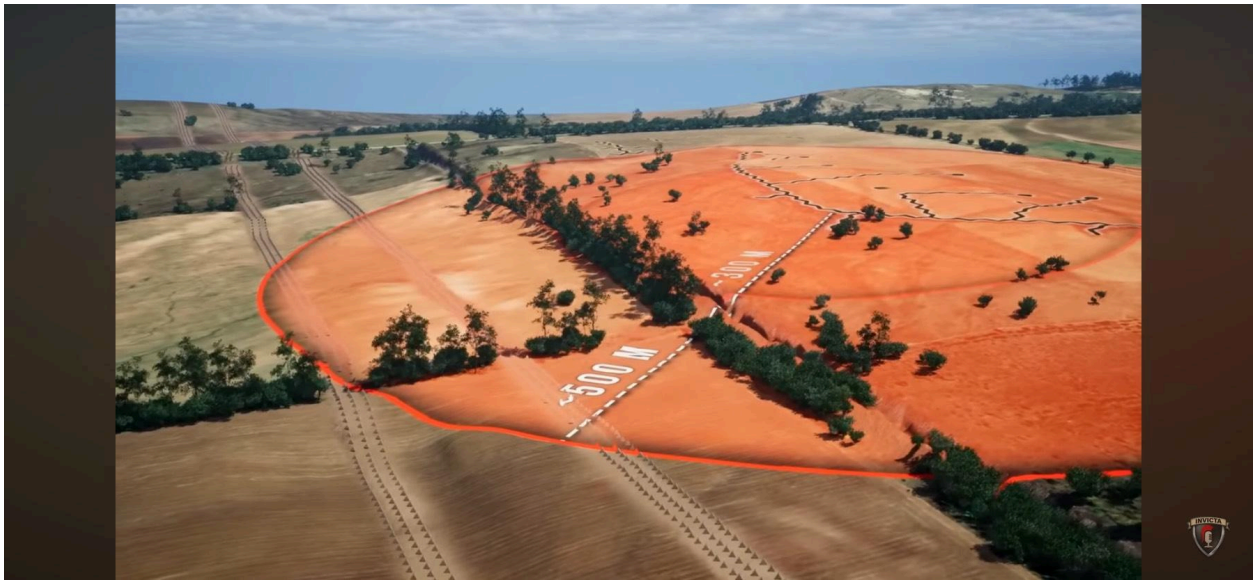
Instead of immediately settling the battle. Having several lines of defense, allows several attempts of defense before retreat from the battle becomes necessary.

So in practice there almost can't be too much fortifications prepared. The more the better, and the harder it becomes for the attacker to move the defenders from the area.

Here's a large example of several long networks of many lines of defense. This allows a thorough defense of this entire town.
It has many lines of defense and covers all flanks. And has dugg routes for movement between these.
Notice the zig-zag patterns, these are against grenades. If a grenade lands in the trench, its blast radius is cut off by the trench walls.

Defensive fortifications that should always be prepared when staying in the same place for a few days or longer. It creates spots where your infantry can stay without easily being bombed out with artillery.
And if you advance towards the enemy you always have spots you can retreat back to.
So digging a lot of defensive fortifications whenever possible is demanding physically but does make your infantry very defensively capable.
I do suggest prioritizing using dead tree trunks on the ground before cutting down trees. Because standing trees do provide observational protection, it covers the vision on the soldiers and their fortifications.





If possible one should try and replicate the Russian defensive fortifications strategy which evidently works very well.

First a layer of metal spiders, then dragon teeth, and then anti-vehicle ditches. With layers of mines between them.
This prevents initial vehicles and infantry from getting close and overrunning the fortifications.

A couple hundreds of meters later are the actual trenches with infantry or vehicles. The trenches are usually a large network with flanks, reserve lines, and deep headquarters.

And there are defensive fortifications and trenches behind the front one as a reserve and fall back line. Usually 1 or 2 of these fall back lines.

And behind all the defensive lines of fortifications is the artillery. Which will be approximately 1.5-3 km from the front.

The best tactics to attack defensive fortifications are:
1 Suppressive fire from artillery, to help let the infantry march along the sides, preferably in woods and forest to flank the fortification.
Use mine detectors against potential mines. And hiding in the anti vehicle trench is fitting for pauses in the attack, as it is basically a trench. Drone operator teams can fittingly hide in the anti-vehicle trenches.
2 Once they have the flank, and want to charge, the artillery stops or prioritizes the opposite side. While the drone operators begin precision strikes on the flank fortifications.
This allows the infantry to storm the flank.
3 The drone operators shift focus to the other side as well to cut off enemy soldiers from supporting or moving to the flank. Once allied troops secure the flank.
Slowly the infantry now pushes out the enemies.

Warfare Theory and Tactics

Standard Formations and Operational Procedures

As with configurations, these are not set in stone, and deviations can be made depending on the circumstance.
For example if a neighbor platoon was hurt in battle, those not wounded can join different teams in the groups of your platoon. And the damaged platoon is disbanded.
So having extra soldiers in different places is not wrong and normal. But this requires that people are aware of where the other teams, groups, platoons are. So that if their configuration is broken, they can join the closest other one.
Or if the chain of command is broken, for example the platoon leadership is entirely killed, the groups might move to join another platoon. Or if the group leadership is killed, teams might consider joining another group instead of trying to organise a very small group.

So having extra soldiers, teams, groups, platoons, in configurations isn’t wrong. And this system is very flexible. All that is required is that the new soldiers configure their radios with the new chain of command. They simply send a man over to configure his radio, alternatively there’s notes with the preconfigurations that the soldier just reads off.

Group formations:

Line: team1, team 2, team3
groupleadership (groupleader, vice group leader, extra soldiers with radios)

Standard attacking formation. Three teams in a line with maximum weaponry that can be used against the enemy. When combat begins, this is the formation the groupleader wants to achieve.
The groupleadership team is behind and focuses on communications, with the platoon leadership, and reports the situation to the platoon leader (enemy strength and distance/location, ammunition, wounded, etc). Groups are usually such small configurations that in practice there is no need for radio communication between teams.
All teams keep eye contact with other teams. And they regularly check for hand commandments or listen for commands shouted.

Row:
team1
groupleadership
team2
team3

Standard marching formation in the field. Everyone just marches in a long row. And a normal formation you encounter the enemy in. Which is not bad, as less people are exposed to the initial fire. Then the groupleader orders line formation, and gives further directives if so appropriate, for example where the different teams should go.

Platoon formations:

Marching formation (not in battlefield):

group1 (row)
platoon leadership (row)
group2 (row)
group3 (row)

The front group can rotate who leads the march. Normally the platoon leadership group does it.

Marching formation (in the battlefield, prior to first enemy contact):

group1 (row) group2 (row)
group3 (row) platoonleadership

Group3 functions as a flexible extra group. A reserve which can extend the line, flank, replace a wounded group, etc. Group3 also functions as cover for the left or right flank. If you have a group4 then that group can cover the other flank and also function as a reserve group.

The reason that the groups are in rows is because the enemy has not yet been encountered, and the platoon should avoid having many people at the very front who will likely be killed in the initial fire.

Standard attacking formation (movement after first enemy contact):

group1 (line) group2 (line)
group3 (row) platoonleadership

The reserve groups remain in row and covers the flanks, until they are called to do something else. If a platoonleader receives more groups he can either add to the front line, or add more reserve groups.

After first combat contact with the enemy, the platoon tries to achieve this formation, and will hold it when continuing to march forward.
And so if the enemy is killed or retreates, this is the formation that the enemy is chased after with.

From this formation there are several options to use the reserve group:

Extending the line: group3 (line) group1 (line) group2 (line)

Flanking the enemy:
group3 (row)
group1 (line) group2 (line)

If a group is too low on ammo or too wounded to continue, then the platoonleader can first extend the line with group3. Before ordering the wounded group to take the reserve position.
Wounded or low ammo groups can effectively refill ammunition or treat wounded in the reserve rather than at the very front.
So switching groups is very common on the battlefield. It is good to have flexible groups in reserve, so that not all the resources are tied down in battle.
Example:

group1 (line) group2 (line)
group3 (row) platoonleadership

Group1, needs ammo and is wounded. Platoonleader puts in order for ammunition refill.
Suddenly group 1 reports it is too wounded to continue and has almost no ammo. Platoonleader puts in order for evacuation also.
He then extends the line with group3.
group3 (line) group1 (line) group2 (line)

Then he lets group1 retreat into reserve.
group3(line) group2 (line)
group1 (row) platoonleadership

Group1 can now start treating wounded more effectively, prior to evacuation. And refill ammunition, when refill arrives.
If the group can continue it reports so, otherwise it informs the platoon leader it will merge with the other groups.

The exact same logic applies to warfare on the company with its platoons.

Strategy of Warfare

The goals of warfare and the means to achieve them determine the best strategy.
For paramilitary organisation, usually it involves preparing bases and weapon's caches (building up military strength), destabilizing society and immobilizing it, capturing and replacing the function of the state (a state coup).

To achieve a state coup, paramilitary organizations need to build up strength in every way possible, supplies of weaponry, money, manpower, inside connections to the military, etc.
And then prepare weapons caches, defensive structures, military bases close to crucial targets, headquarters.
Lastly, depending on the circumstances, it may be an opportunity to perform a state coup. Which would mean capturing the parliament, supreme court, and as much of the governing body as possible, like; party leaders, tv-stations, schools, military leadership, important infrastructure (roads, bridges, railways, water towers, electrical grids or towers, data buildings), and government bodies; institutions, police buildings, hospitals, etc.
Roads can be blocked, bridges blown up, and placing derailers will derail any train on the railway.

Most importantly the leadership needs to be captured, and replaced, which means physically positioning your own people at important institutions to dictate under threat of penalty, and communicate with headquarters.
That would be the minimum. But the more personnel and institutions you can seize and replace the leadership of the better.

What you want to avoid is letting it become a civil war. A state coup can happen overnight. But if you allow the old government to contact the military then suddenly it becomes a civil war, which will take a long time, and international forces will try and intervene immediately.

Paramilitary organisations are naturally very small or not powerful to begin with, and need to establish themselves.
The safest places are usually those that are very hard to travel through and provide natural observational protection, like forests. But of course being closer to civilization allows shorter transportation and being closer to crucial targets.
So it is mostly recommended to place weapons caches, headquarters in storage facilities in city outskirts. Meanwhile you also place weapons caches, headquarters, training grounds and defensive structures in forest areas close to villages and not too far from an important target.

The defensive structures are meant to allow a defense against police or military if it became necessary to move the location.
The city locations are more risky and hard to defend, and should thus be less active.
Basically forest locations are mostly active, and can be defended if needed to relocate. And city locations are meant to be there once a state coup is about to begin, it functions as another spot of mobilizing troops.

Crucial targets you want bases close to are important infrastructure (roads, bridges, railways, water towers, electrical grids or towers, data buildings), parliament, supreme court, tv-stations, police stations, hospitals, military bases, power stations, nuclear power plants, etc.
And when executing a state coup the goal is to occupy as many of these. Killing those who resist, or subduing them.
If the state is captured and cannot communicate with the nation to amount any defense, along with the nation not being able to properly function against the paramilitary organisation, then naturally the nation is forced to obey the paramilitary organisation.

And this means the paramilitary needs to enforce its laws. Basically put people who disobey in jail, or even kill them.

Most importantly is capturing and replacing the state, parliament and supreme court, and immobilizing police stations, and military bases.
Which is of course helped by having as many insiders as possible.
And of course securing as many other important institutions of the country. And replacing the leadership.

Otherwise it is done after the coup. Most importantly establishing communication between your appointed leaders.
And when people resist they are put in jail or shot.

Most simple, quick and effective damage to the government is to target water towers, gasoline pipes, electrical grids. Simply use explosives to damage these. Explosives can also be used to destroy important bridges.
Further use train derailers to derail trains and immobilize the railways.
Lastly target data buildings and server buildings, tv stations, radio stations, this will help break communication and internet access. Websites become inaccessible, credit card services will not function (and cause immense economic losses for companies and the state).

If a civil war scenario, or semi civil war, breaks out, then I recommend using those simple methods of damage as aggressively as possible. Otherwise they remain something which should be used in retaliation to something the system does.
If not at war with the state then it is better to only threaten the state with these acts if they want to enact some problematic law or similar.
Only start a war when ready to seize many of the important institutions, most importantly the army.

It should be stated.
Firearms are needed for ground fighting and to control.
Explosives are used for grenades, mines, drone bombs, clearing spaces, breaching doors or walls, destroying vehicle, infrastructure or building targets, and sabotage.
Sedatives, poisons, and all other weapons or tools, are used for kidnappings or assassinations.
Above mentioned are weapons the paramilitary can use, most importantly firearms.
But much more is needed and should be considered as: manpower, legal income, illegal income, self sustainment (owning your own farms, restaurants, gyms, stores, mechanic shops, etc), defensive structures and capabilities (hidden bases and weapons caches with lines of trenches), infiltration of institutions (most important the army).

I most strongly recommend getting a hunting/shooting license and/or joining the army or the police.
Building up a storage of weaponry, and gathering manpower is the way a state is overthrown.
Gathering rifles and ammunition is crucial. And explosives can be used to make improvised grenades, bomb carrying drones, breaching chargers (meant to breach strong doors).

Immediate Steps to Improvement

1 Marry and have many children. Raise them with proper values and skill set to fight against the system.
2 Join the army, police and start careers there.
3 Shooting license, hunting license, become a gun collector. Mass gather weaponry and ammunition.

4 Steal, improvise or buy any and all weaponry, money, chemicals, lab equipment, tools, vehicles, 3D-printers, drones.
Stockpile all of these and food, water or other supplies.
5 Buy a farm or start growing your own food. Become self reliant.
6 Train derailers. Derailing trains is very easy.
“Train derails” or “train derailers” can be purchased, and these are metal tools placed on the tracks, and once a train hits them they derail. These do it reliably, but placing rocks on rails is also a simple method that sometimes does the trick.
Otherwise building a derailer is quite simple,
They can probably be built very easily with scrap metal.
I suggest civilian forces collect these, and iron spider blockades, or iron spike for roads, basically infrastructure disrupting tools.
These could be extremely effective in a conflict, if civilians can disrupt the usage of trains, car, busses, it would totally handicap the system and make it hard to mobilize and transport forces.
So civilians can be storage and help prepare weapons caches. And in conflict they can sabotage infrastructure.
7 Start businesses like restaurants, junkyards, gyms, pawn shops, hunting stores, etc.
Become self-sufficient, and get fronts for buying items, and have organizations like junkyards or recycling stations to get free junk and hopefully cars, where you can scrap them for guns, bombs, tools, equipment, etc, and not useful parts can be restored and sold.
Business can be used as fronts for money laundering, buying useful things and weapons, and are sources of income for the paramilitary organisation.
8 Practice making improvised firearms, explosives, and ammunition (using the explosives). Also try the drone carrying an explosive combination.
9 Network with nationalist organisations, get involved in smaller crimes, and have processes to test new people (to make sure they are not police, but are loyal), and initiate them into deeper and more important crimes.
10 Initiated can be informed of the paramilitary initiative. And are trained and prepared for an eventual armed conflict. But is then sent to recruit new people through nationalist crime initiatives.

References

[1] U.S. Army Hand-To-Hand Combat, Department of the Army

[2] Code of Canon Law - Book Four - Chapter 3 https://www.vatican.va/archive/cod-iuris-canonici/eng/documents/cic_lib4-cann998-1165_en.html#CHAPTER%20III.

[3] “Making homemade body armor” Joemycheck1 https://www.youtube.com/shorts/7ZqYqK8awCI

[4] “How to make a stun gun with a capacitor” https://taserguide.com/how-to-make-a-stun-gun-with-a-capacitor/

[5] “The ZIP Gun” https://thehomegunsmith.com/pdf/ZipGun.pdf

[6] “Hollywood V Reality: Steel Wool, Cotton Balls, and Expanding Foam. Don’t try this at home” https://www.youtube.com/shorts/APmaiXoWvfg

[7] “Do Oil Filter Silencers even work?” https://www.youtube.com/watch?v=b82a0wMGSTk

[8] “Solvent Trap Suppressors Dangerous?” https://www.youtube.com/watch?v=SxElM8XiU8c

[9] “Thermites & Thermates” Dugan Ashley, 24 Jun 2025 https://www.youtube.com/watch?v=pnrA02ohqBg

[10] “Pentaerythritol tetranitrate”, 25 Jun 2025 https://en.wikipedia.org/wiki/Pentaerythritol_tetranitrate

[11] “TNT equivalent” 26 Jul 2025 https://en.wikipedia.org/wiki/TNT_equivalent

[12] “Advanced Explosive Design [p1]”, Dugan Ashley, 11 Jan 2024 https://www.youtube.com/watch?v=I_O-4M0_dsM

[13] “AED [p1]”, Dugan Ashley, 12 Jan 2024 https://www.youtube.com/watch?v=pnJlfCe_7Rg

[14] “Nickel(II) carbonate”, Wikipedia, 24 June 2025 https://en.wikipedia.org/wiki/Nickel(II)_carbonate

[15] “Aminoguanidinium bicarbonate”, Sciencemadness, 7 May 2021, https://www.sciencemadness.org/smwiki/index.php/Aminoguanidinium_bicarbonate

[16] “Sodium nitrite”, Wikipedia, 15 Aug 2025 https://en.wikipedia.org/wiki/Sodium_nitrite

[17] “Nitric Acid From Thin Air”, Cody’sLab, 10 Aug 2015 https://www.youtube.com/watch?v=ep23ds4cZs4

[18] “Making Nitric Acid From Air (DIY Birkeland-Eyde Reaction", DBX Labs, 2 Aug 2020 https://www.youtube.com/watch?v=4spP-L-RuGY

[19] “le Nitric Acid Still”, Dugan Ashley, 21 May 2025 https://www.youtube.com/watch?v=LB0dNvIbduA

[20] “Sulfuric Acid From A Car Battery”, Scrap Science, 18 Jan 2021 https://www.youtube.com/watch?v=wBUzGLEIIQw&list=WL&index=459

[21] “Purifying Sulfuric Acid Drain Cleaner”, NileRed, 17 Jan 2016
https://www.youtube.com/watch?v=4DUGRWjdNLI&list=WL&index=457

[22] “Make Sulfuric Acid (Copper Sulfate Electrochemical Method)”, NurdRage, 26 Dec 2009
https://www.youtube.com/watch?v=5dUSF9Gl0xE

[23] “Making Sulfuric Acid From Epsom Salt”, Scrap Science, 4 Nov 2018
https://www.youtube.com/watch?v=6BThiJpbBJQ

[24] “Making Sulphuric acid (Easiest way), Prussian Blue, 23 Dec 2022
https://www.youtube.com/watch?v=p7g4OyGuLV4

[25] “Making H2SO4 from Sulfates and HCL”, Chemical Engineering, 20 Dec 2020
https://www.youtube.com/watch?v=XWTuRMQE02I&list=WL&index=24

[26] “Make Hydrochloric Acid”, NurdRage, 2 Oct 2010 https://www.youtube.com/watch?v=YGjd7xxTuZw

[27] “Inorganic Chemistry”, Holleman-Wiberg, 2001, page 442
“https://books.google.se/books?redir_esc=y&hl=sv&id=Mtth5g59dEIC&q=hypochlorous+acid#v=snippet&q=hypochlorous%20acid&f=false

[28] “Acetic Anhydride from Vinegar: The Sulfur Chloride Route | OTC Acetic Anhydride Synthesis”, LabCoatz, 2 Jan 2023 https://www.youtube.com/watch?v=OrZ5Oa9K1R0

[29] “Preperation of ethanal (acetaldehyde) + Fehling’s test”, Astral Chemistry, 29 Dec 2016
https://www.youtube.com/watch?v=KBy_cjnMjpo

[30] “Turning Plastic Waste into Benzene”, jam_kemist, 17 Feb 2024
https://www.youtube.com/watch?v=ipq9GRFq8Eo

[31] “Diethyl Ether and Heptane from Starting Fluid | Obtaining Lab Solvents (episode 1)”, LabCoatz, 1 Jan 2022
https://www.youtube.com/watch?v=qmqBkr2MGi4

[32] “Extracting urea from my own pee”, NileRed, 3 Dec 2017 https://www.youtube.com/watch?v=sfldS5hqWYA

[33] “Direct synthesis of ammonia gas (Serpek Process)”, Astral Chemistry, 28 Jan 2017
https://www.youtube.com/watch?v=ZRFai58q1J8

[34] “Making anhydrous ammonia from urea and sodium hydroxide”, Thy Labs, 24 Aug 2021
https://www.youtube.com/watch?v=zbCpuEWLOww

[35] “Getting Guanidine Carbonate and Hydrochloride from No-Lye Hair Relaxants”, NurdRage, 26 Aug 2017,
https://www.youtube.com/watch?v=wmWTF3lBDEI

[36] “Ammonium nitrate from store bought ammonia & air”, Darian Ballard, 5 March 2021,
https://www.youtube.com/watch?v=ueYvcbg69zg

[37] “The #1 Best Gorilla Explosive”, Dugan Ashley, 5 May 2025,
https://www.youtube.com/watch?v=TPBQnnKARbE

[38] “Guanidine nitrate synthesis from urea and ammonium nitrate (dihydrazino tetrazine DHT part 1)”,
NinjaChemist, 30 Mar 2025 https://www.youtube.com/watch?v=A6ppJo1VDpU

[39] “SADS [primary explosive]”, Dugan Ashley, 19 Oct 2023 https://www.youtube.com/watch?v=R9rlhJrFmKc

[40] “ETN Overview [erythritol tetranitrate] p1”, Dugan Ashley, 31 Jan 2024,
https://odysee.com/@DuganAshley:e/ETN--erythritol-tetranitrate--p1:3

[41] "ETN part 2, synthesis, binary comps", Dugan Ashley, 28 May 2024, https://odysee.com/@DuganAshley:e/etn2:3

[42] "PETN", Dugan Ashley, 3 Oct 2024, https://odysee.com/@DuganAshley:e/1001:8

[43] "XPN xylitol pentanitrate #chemistry #science", Darian Ballard, 12 Feb 2024 https://www.youtube.com/watch?v=g5sLY9wrzms

[44] "Ethylene glycol dinitrate", Wikipedia, 13 Feb 2025, https://en.wikipedia.org/wiki/Ethylene_glycol_dinitrate

[45] "Making Hexamine", Apoptosis, 1 Sep 2023, https://www.youtube.com/watch?v=SYOze014tW0

[46] "How to make RDX, overview [part 1 of 2]", Dugan Ashley, 31 Jan 2024, https://odysee.com/@DuganAshley:e/RDX--part-1-of-2-:b

[47] "How to make RDX [part 2 of 2]", Dugan Ashley, 31 Jan 2024, https://odysee.com/@DuganAshley:e/RDX-Synthesis--part-2-of-2-:c

[48] "Hexamethylenetetramine Dinitrate (HDN): The Precursor for RDX Production by Bachmann Process", Turhan and co, 2013, https://www.wellesu.com/10.1002/prep.201200162

[49] "Explosives - Nitramines", GlobalSecurity, https://www.globalsecurity.org/military/systems/munitions/explosives-nitramines.htm

[50] "Preparative Chemistry review pieces & Bachmann (historical references", Thomas M. Klapötke, 2025, https://api.pageplace.de/preview/DT0400.9783111447087_A62621008/preview-9783111447087_A62621008.pdf

[51] “Hexamethylene triperoxide diamine”, wikipedia, 10 Jun 2025, https://en.wikipedia.org/wiki/Hexamethylene_triperoxide_diamine

[52] “Density Functional Theory and X-ray Investigations of P- and M-Hexamethylene Triperoxide Diamine and Its Dialdehyde Derivative”, Wierzbicki and co, 21 jun 2001, https://www.pismin.com/10.1021/jp0123841

[53] “R-SALT”, Dugan Ashley, 9 Dec 2024, https://odysee.com/@DuganAshley:e/tmtn2:5

[54] “Nitrostarch Synthesis and Tests”, Edward Tries, 28 May 2023, https://www.youtube.com/watch?v=oWUbduRo8Ns

[55] “TNT [Trinitrotoluene]”, Dugan Ashley, 17 Nov 2023, https://www.youtube.com/watch?v=H0OI3hyjkFM

[56] “TNT Trinitrotoluenes and Mono- and Dinitrotoluenes: Their Manufacture and Properties.”, G. Carlton Smith, 1918, https://dn790003.ca.archive.org/0/items/tnttrinitrotolue00smitrich/tnttrinitrotolue00smitrich.pdf

[57] “Nitroguanidine aka [NQ]” Youtube, Dugan Ashley, 28 Sep 2023 https://www.youtube.com/watch?v=Wc2HzwOMIVE

[58] “Nitrouera”, A. W. Ingersoll and B. F. Armendt, 1925, https://www.orgsyn.org/demo.aspx?prep=cv1p0417

[59] “NITROMETHANE”, F. C. Whitmore and Marion G. Whitmore, 1923, https://www.orgsyn.org/demo.aspx?prep=cv1p0401

[60] "DIY Lead-Dioxide Electrode: Virtually free and Easy Method", Blue Moonshine, 29 May 2024, https://www.youtube.com/watch?v=tzyUda3upHI

[61] "A Sodium Chlorate Cell", Scrap Science, 10 Nov 2021, https://www.youtube.com/watch?v=N45DlWLQ218

[62] "Potassium Chlorate Synthesis Two Ways", Apoptosis, 13 Jan 2024, https://www.youtube.com/watch?v=A1FxEg9MOag

[63] "A Potassium Chlorate Cell", Scrap Science, 29 Jun 2021, https://www.youtube.com/watch?v=CqMEnrQb5q8

[64] "The Simplest (But Most Expensive) Perchlorate Cell", Scrap Science, 9 Mar 2025 https://www.youtube.com/watch?v=cclQl6JeZOg

[65] "Lab Notes - Making Sodium Perchlorate Without Electrolysis, MIH0319, 18 Feb 2024, https://www.youtube.com/watch?v=BBjKIkzf9Tg

[66] "Perchlorate production via electrolysis, with PbO2 anode, Feanor Forges, 18 Apr 2021, https://www.youtube.com/watch?v=cxmuHoh7ObM&t=1s

[67] "Ammonium perchlorate synthesis", Feanor Forges, 25 Jun 2021, https://www.youtube.com/watch?v=QvFt8myD7Gs

[68] "Transforming Table Salt into Rocket Fuel: Ammonium Perchlorate", jam_kemist, 18 apr 2025 https://www.youtube.com/watch?v=gf1AoHq5Zjw

[69] "NAP [primary explosive]", YouTube, Dugan Ashley, 18 Sep 2023, https://www.youtube.com/watch?v=Y0TJvbuF4yI

[70] “NAP Advancement”, Youtube, Dugan Ashley, 22 May 2024, https://www.youtube.com/watch?v=VR_9GZlIRRo

[71] “Hydrazine Sulfate”, Dugan Ashley, 5 Jun 2024, https://www.youtube.com/watch?v=SwFduB27qzo

[72] “Making Hydrazine Sulfate from Urea and Bleach”, Nilered, 19 Feb 2016, https://www.youtube.com/watch?v=PCovDr4FVNQ

[73] “Nickel Hydrazine Nitrate”, Apoptosis, 13 Jul 2023, https://www.youtube.com/watch?v=enJAVGGTPQ4

[74] “Tetrazene synthesis from Vinegar (and other chemicals), DBX Labs, 8 Jan 2020, https://www.youtube.com/watch?v=9YWmejywBHg

[75] “Making Tetrazoles ❙ One of the Most Nitrogen Containing Compounds”, Savinja Labs, 17 Jun 2025, https://www.youtube.com/watch?v=YpqeFap2s90

[76] Aakeröy, Christer B.; Wijethunga, Tharanga K.; Desper, John . (2015). Crystal Engineering of Energetic Materials: Co-crystals of Ethylenedinitramine (EDNA) with Modified Performance and Improved Chemical Stability. Chemistry - A European Journal, 21(31), 11029-11037. doi:10.1002/chem.201501721

Sci-hub link: https://www.pismin.com/10.1002/chem.201501721

[77] “LASL explosive property data”, Gibbs and Co, 1980, p 163-164, https://archive.org/details/LASL_Explosive_Property_Data/mode/2up

[78] “Insensitive explosive from urea. NTO, nitrotriazolone”, NinjaChemist, 2 Aug 2025, https://www.youtube.com/watch?v=fHBqgnZDffY

[79] Maksimowski, P., & Gołofit, T. (2012).
4,10-Dinitro-2,6,8,12-tetraoxa-4,10-diazatetracyclo[5.5.0.05,903,11]dodecane Synthesis. Journal of Energetic Materials, 31(3), 224-237. https://doi.org/10.1080/07370652.2012.716490
Sci-hub link: https://www.pismin.com/10.1080/07370652.2012.716490

[80] “FM 5-250: Explosives and Demolitions”, 30 Jun 1999
https://ia601608.us.archive.org/5/items/military-field-manuals-and-guides/U.S.%20Army%20explosives%20and%20demolitions%20handbook%20%28%20PDFDrive%20%29.pdf

[81] “Detonators”, Dugan Ashley, 26 Aug 2024, https://odysee.com/@DuganAshley:e/detonators:4

[82] “Dug’s Detonator Secrets”, Dugan Ashley, 14 Apr 2025,
https://odysee.com/@DuganAshley:e/dugsdetsecrets:2

[83] “FM 5-31: Boobytraps”, 1965, https://archive.org/details/milmanual-fm-5-31-booby-traps/mode/2up

[84] “TM 31-210: Improvised Munitions Handbook”, 2007 (edition),
https://archive.org/details/usa-tm-31-210-improvised-munitions-handbook/mode/2up

[85] “A Review of Works on Shaped Charges”, Ahmed and co, 2017,
https://etasr.com/index.php/ETASR/article/view/1532/625

[“For short stand-off distances, copper, aluminum, steel, zinc,
lead or glass liners are preferred depending upon their
penetration capability. The materials having high ductility
always give better penetration.
The copper liner gives a better penetration at a stand-off distance 1-3 charge diameter (CD) in
case of fixed steel target, while aluminum gives maximum penetration at a stand-off distance of 5-7CD.
Hence for maximum penetration at a short stand-off distance, copper liner
should be preferred.
For longer stand-off distances like aircraft as a target, the low density liner should like aluminum should be
preferred, because low density target receives highest penetration with a low density liner.
It is also mentioned in the literature that cone apex angle for a shaped charge should be
between 40° and 60°. Since a liner with a smaller cone apex angle gives penetration at smaller stand-off distances.

However machining the liner with a small cone apex angle is a challenge.
The maximum wall thickness is also in the range of 2-4% of the CD."]

[86] "A practical review study on shaped charge in the last two decades (2000-2020)", Mehmannavaz and co, 2021, https://doi.org/10.1177/20414196211017923 or https://www.pismin.com/10.1177/20414196211017923
["Kamarudin et al. (2016) investigated the penetration depth of a shaped charge with small geometry into steel targets… Copper liners with cone angles of 30°, 42°, and 60° were investigated. also, parameters such as case material and its thickness, and standoff distance were analyzed, as well. The best penetration depth in the steel layer obtained for a cone angle of 42° with a standoff distance of 2.5 CD, using the liner thickness of 0.5 mm."]

["Furthermore, they showed that the cone angle of 140° causes the largest entry crater diameter on the first layer multi-layered targets. The results also indicated that for all layers, the exit crater diameter was larger than the entry one. With a comparison between different liners, they found that the copper liner caused the deepest penetration and the least entry crater diameter, while the aluminum liner caused the smallest level of penetration and the largest entry crater diameter. For both targets, the steel liner value was between those of copper and aluminum."]

[87] "Improvised Shaped Charges", Desert Publications,
https://dn710006.ca.archive.org/0/items/resistance_202309/ImprovisedShapedCharges_text.pdf

[88] "Ballistics 2011: 26th International Symposium", chapter "Improvised Shaped Charges" on page 341, Baker and co, 2011,
https://books.google.se/books?hl=sv&lr=&id=L9oaDntTOvwC&oi=fnd&pg=PA340&dq=shaped+charge&ots=qUlPVkafZI&sig=UF2BKLagmtHJ0_4YyFIMlNNYdTU&redir_esc=y#v=onepage&q=shaped%20charge&f=false

[89] "Preparing Potassium Cyanide - DO NOT ATTEMPT", The Canadian Chemist, 11 Dec 2023,
https://www.youtube.com/watch?v=UdoUQkzFvSg

[90] "HOW TO ISOLATE AMYGDALIN TO APRICOTS SEEDS. #ncchem", NCCHEMISTRY, 13 Jan 2023,
https://www.youtube.com/watch?v=swYeDieRda8

[91] "How to Make Chloroform", TheChemistryShack, 13 Sep 2016,
https://www.youtube.com/watch?v=7ilKvNmPDy8&t=29s

[92] “Making a Hypnotic Sedative from Acetone”, Apoptosis, 15 Jun 2024, https://www.youtube.com/watch?v=fXIlkGNRcPE

[93] “Making an old hypnotic sedative and preservative”, NileRed, 17 Jun 2017, https://www.youtube.com/watch?v=TzbkRC3rYEo

[94] “Synthesis of chloral hydrate (OTC)”, Hazel Chem, 30 Dec 2017, https://www.youtube.com/watch?v=LnwuKRMGyh4

[95] “CIA Field-Expedient Key Casting Manual”, 1988, https://ia600108.us.archive.org/34/items/CIAFieldExpedientKeyCastingManual/CIA%20-%20Field-Expedient%20Key%20Casting%20Manual_text.pdf

[96] VaultCracker36 https://www.youtube.com/@VaultCracker36/videos

[97] “How easy it is for the Kia Boys to steal a car”, https://www.youtube.com/shorts/acO1C8xH2T8

[98] “A Study of Assassination”, CIA, 1953, https://ia601000.us.archive.org/29/items/CIAAStudyOfAssassination1953/CIA%20-%20A%20Study%20of%20Assassination%20%281953%29.pdf

Appendix

[1] Navy Seals Workout

https://www.youtube.com/watch?v=5J9Au3sU1hw
“This series of exercises should be done twice a week in conjunction with either a running or swimming program.”(49:22)

notice: “2 count” signifies that the exercise has two stages of body positions and will be done at the tempo of 1 second per rep. “4 count” signifies that the exercise has 4 stages of body positions and will be done at the tempo of 2 seconds per rep.

notice: between the warm up exercises, it's good to shake your arms and body, to loosen the muscles and work out lactic acid.

notice: when doing trunk stretches, don't twist your trunk.

notice: the pull and chin ups are done full range of motion, slow and controlled (no kicking or kipping) and with short pauses at the top and bottom, this is the reason for the low rep count. The rest between sets is 30 seconds.

notice: Material is needed, this is: pull up bar and dip bar.

Remember: to keep your head up and back straight during dips.

Notice: Push-ups are done with full range of motion, slow and with short pause at the top and bottom position. Keep your head up so that you're looking forward and keep your back straight.

Notice: during regular sit-ups keep your hands behind your head and avoid pulling your head, just use your abdominal.

Program:

Warm up:

Jumping Jacks (4 count) 1 x 40, corresponds to 80 regular jumping jacks.

Half jumping jacks (2 count) 1 x 30

Windmills (4 count) (first one slow) 1 x 8

Windmills (2 count) 1 x 16

Trunk side stretches (4 count) (first one slow) 1 x 8

Pull Exercises:

30 sec rest between sets

Close grip pull-ups 1 x 3

Wide grip pull-ups 1 x 3

Close grip chin-ups 1 x 3

Behind the neck pull-ups 1 x 3

Regular grip pull-ups 1 x 3

Close grip pull-ups 1 x 3

[I personally recommend more pull]

Push Exercises:

1 minute rest between sets

Dips 1 x 12, 1 x 11 (20 sec pause at bottom position on last rep), 1 x 16 (1 min pause at the bottom position or hold almost until failure then up)

Shake it out between sets

Regular push-ups 2 x 10

Tricep push-ups 1 x 7, 1 x 10

Regular push-ups 1 x 10

Tricep push-ups 1 x 7

Wide grip push-ups 1 x 10

Regular push-ups 1 x 10

Tricep push-ups 1 x 10

Dive bomber push-ups 1 x 7

Abdominals:

Situps 1 x 50

Cross arm situps 1 x 50

flutter kicks (4 count) 1 x 30

Half situps 1 x 15

Cruncher situps 1 x 25

Lizard stretch (10 second pause at the top position) 1 x 3

Atomic situps 1 x 40

Good morning darlings 1 x 100

Neck rotations (4 count) 2 x 50

Neck lifts 1 x 100

Legs:

Lunges (4 count) 1 x 20, corresponds to 20 on each leg

Squats 1 x 200

Charlie chaplins 3 x 30

Squat 1 x 50

Another good work out is the “Murph challenge”:
3.5km run
300 squats
200 push ups
100 pull ups
3.5km run

(I recommend starting with “half-murphs”, meaning you do half of each:
1.75km run (or 3.5km and no run on the end)
150 squats
100 push ups
50 pull ups

And increasing to full Murphs if halves no longer require much rest)

[2] FGC-9 MK II

THE GATALOG
PRESENTS

FGC-9 MK II

POWERED BY WEAPONIZED AUTISM™

Published by

The GataLog
April 16th, 2021

Document version: 1.3

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Co-Designers of the FGC-9 MkII:

JStark1809
IvanTheTroll
3socksandcrocs

Website: https://www.deterrencedispensed.com/

Special thanks to:
- An unnamed individual
- All members, fans and supporters of Deterrence Dispensed
- Designers whose creations inspired and influenced the FGC-9 MKII
- In particular Derwood for coming up with the Shuty AP9 design,
  on which the FGC-9 MkI and FGC-9 MkII core mechanisms are based on

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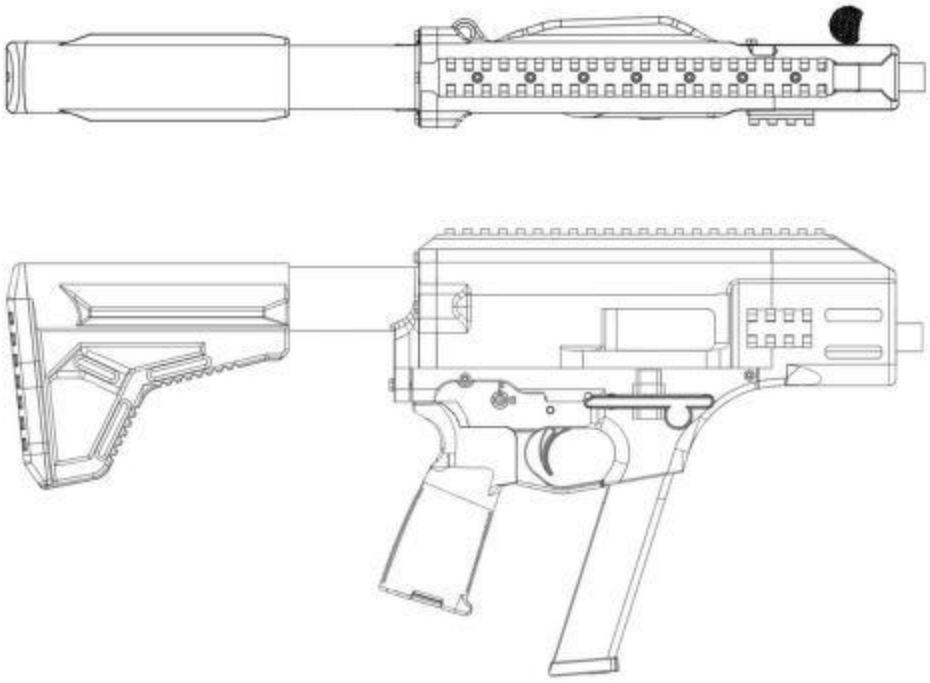
Technical specifications and features



FGC-9 MkII

Type: Pistol caliber carbine

Designers: JStark1809, IvanTheTroll, 3socksandcrocs

Designed: 2020-2021

Mass(without magazine): 2.2kg

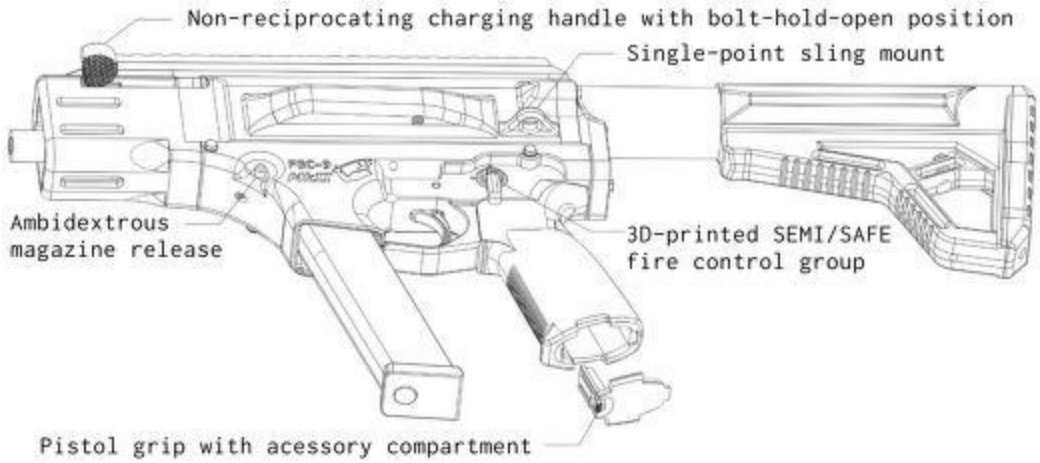
Length: 520mm

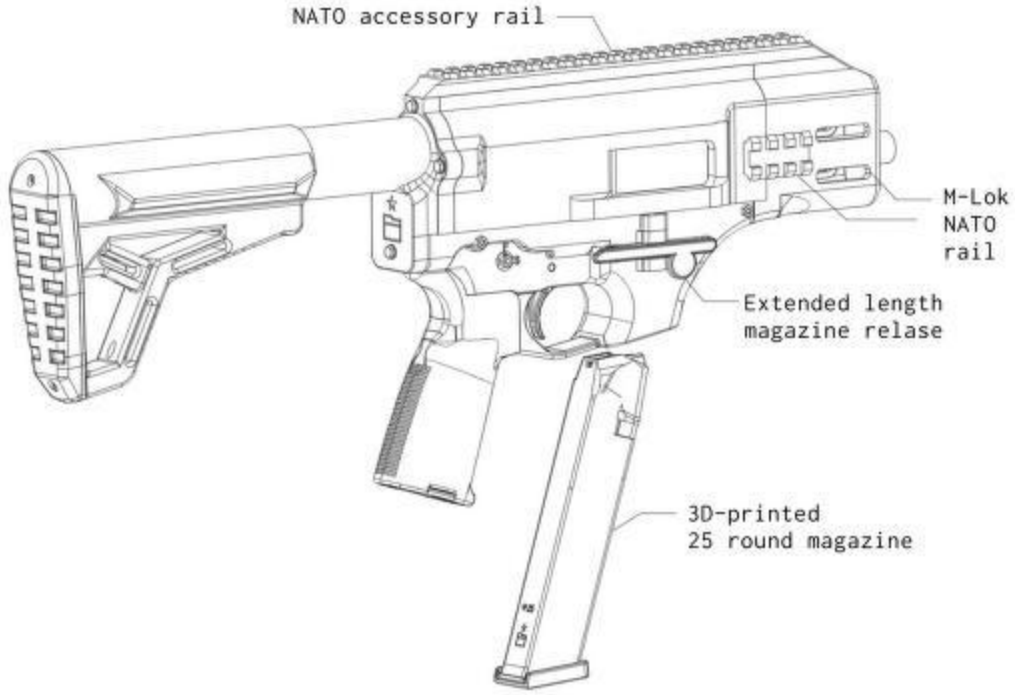
Barrel length: 114mm

Cartridge: 9x19mm Parabellum

Action: Closed bolt straight blowback

Feed system: 25 round box magazine, 33 rounds with OEM Glock magazines


Non-reciprocating charging handle with bolt-hold-open position
Single-point sling mount
Ambidextrous
magazine release
3D-printed SEMI/SAFE
fire control group
Pistol grip with acessory compartment


NATO accessory rail
M-Lok
NATO
rail
Extended length
magazine relase
3D-printed
25 round magazine

5

Message from the author

“What we do now, echoes in eternity”

– Marcus Aurelius

I hope that you appreciate the time and effort that was put into this project as well as the risks that were involved.

If you had success in producing your FGC-9 or simply appreciate the effort of empowering the common man with firearms, consider donating to the developers of this project.

Even a tiny donation will be appreciated. Any funds donated help with future developments and improvements.

DONATION LINKS:

JStark1809

Bitcoin donation page:
https://ctrlpew.com/donate-to-jstark/

XMR(Monero) Address:

424fanLpuQXTR65cFG7WD3VM4dfi1bGC9ffKM7
cwy7u6adQLT9oXsKcisZibmoa5Jv1
GNmuNCXhi9ezWjGsCTcjJTfieKJZ

IvanTheTroll

https://ctrlpew.com/donate-to-ivanthetroll/

Donation links of other developers of the community:
https://ctrlpew.com/donate/
https://defcad.com/partners

3D-Printing

If you have never used a 3D-printer before and/or have never owned one refer to appropriate guides for beginners that include recommendations on what 3D-printer to buy and further relevant information:

- https://www.youtube.com/watch?v=JTN6jtB5mqk
- https://www.enblocpress.com/guide/
- https://ctrlpew.com/the-complete-getting-started-guide/

Once you've figured out how to print basic things that you can download from sites like thingiverse.com, you can go ahead.

The next pages contain the general suggested settings for your printed parts. You can deviate from these settings based on your 3D-printer, consistency of PLA filament and general experience with 3D-printing.

These settings were optimized for Creality Ender 3 printers in combination with the use of the Cura slicer program (V4.8.0).

The FGC-9 was designed to be printed in PLA/PLA+.
Printing it in a material other than this could result in an unreliable, fragile or unsafe firearm. Consider this your warning!

Filament type: PLA (Recommended PLA brands on page 21)
Nozzle size: 0.40mm
Layer height: 0.16mm
Infill density: 100% (99% when using Cura, for shorter print time)
Nozzle temperature: 230°C +-5°C
Bed temperature: 60°C

The orientation of the parts in the slicer program will load up as intended. Do not change the orientation of the .stl models inside your slicer program unless you know what you're doing.

For Cura users, another suggested settings change is on page 16.

After printing each part, make sure to get rid of any edges and artifacts that result out of the nature of 3D-printing. Before you install any 3D-printed components make sure to insert and remove items from their destined place on the receiver multiple times to make sure that they move smoothly if they are intended to do so, which is the case, for example, for the bolt housing. So if a part does not fit or move in the manner you would expect, try to smoothen the surface of the 3D-printed object and get rid of any squished edges with your craft knife.

Do not re-use any parts that you may have from a FGC-9 MkI build. All printed parts have undergone changes, thus re-using MkI parts may lead to malfunctions and less than ideal operation of your gun.

Printed parts list

Use this section as a checklist to ensure you've printed all parts.

	Charging Handle
	Fan Speed: 100%
	Generate Support: ☑ Support Overhang Angle: 45°
	Build Plate Adhesion Type: Skirt
	NOTE:
	Charging Handle Bushing
	Fan Speed: 100%
	No support
	Build Plate Adhesion Type: Brim
	NOTE:
	Barrel Retainer
	Fan Speed: 80%
	Generate Support: ☑ Support Overhang Angle: 85°
	Build Plate Adhesion Type: Brim
	NOTE:

	Drilling Jig Solid Half
	Fan Speed: 100%
	No support
	Build Plate Adhesion Type: Brim
	NOTE:
	Drilling Jig Hole Half
	Fan Speed: 100%
	No support
	Build Plate Adhesion Type: Brim
	NOTE:
	Recess Jig
	Fan Speed: 100%
	No support
	Build Plate Adhesion Type: Brim
	NOTE:
	Headspacing Jig
	Fan Speed: 100%
	No support
	Build Plate Adhesion Type: Brim
	NOTE:
	Only for this part Infill Density: 20%

	Welding Jig
	Fan Speed: 100%
	No support
	Build Plate Adhesion Type: Skirt
	NOTE:
	Only print for weld option
	Bolt Housing
	Fan Speed: 50%
	Generate Support: ☑ Support Overhang Angle: 85°
	Build Plate Adhesion Type: Brim
	NOTE:
	Only print for weld option
	Weldless Bolt Grinding Jig
	Fan Speed: 80%
	No support
	Build Plate Adhesion Type: Brim
	NOTE:
	Only print for weldless option Needs to be printed twice(2x)
	Weldless Bolt Housing
	Fan Speed: 50%
	Generate Support: ☑ Support Overhang Angle: 85°
	Build Plate Adhesion Type: Brim
	NOTE:
	Only print for weldless option

	Feed Ramp
	Fan Speed: 50%
	No support
	Build Plate Adhesion Type: Skirt
	NOTE:
	Ejector
	Fan Speed: 0% / OFF
	No support
	Build Plate Adhesion Type: Skirt
	NOTE:
	Magazine Catch Bar
	Fan Speed: 100%
	No support
	Build Plate Adhesion Type: Skirt
	NOTE:
	Magazine Catch Button
	Fan Speed: 100%
	Generate Support: ☑ Support Overhang Angle: 45°
	Build Plate Adhesion Type: Brim
	Only for this part, Support X/Y Distance: 0.5mm REVERT BACK TO DEFAULT VALUE AFTER YOU PRINTED THIS PART!

	Magazine Catch Pivot Pin Fan Speed: 100% No support Build Plate Adhesion Type: Brim NOTE:
	Disconnector Fan Speed: 20% Generate Support: ☑ Support Overhang Angle: 75° Build Plate Adhesion Type: Brim NOTE:
	Fire Selector Drum Fan Speed: 20% No support Build Plate Adhesion Type: Brim NOTE:
	Fire Selector Lever Fan Speed: 20% Generate Support: ☑ Support Overhang Angle: 75° Build Plate Adhesion Type: Brim NOTE:

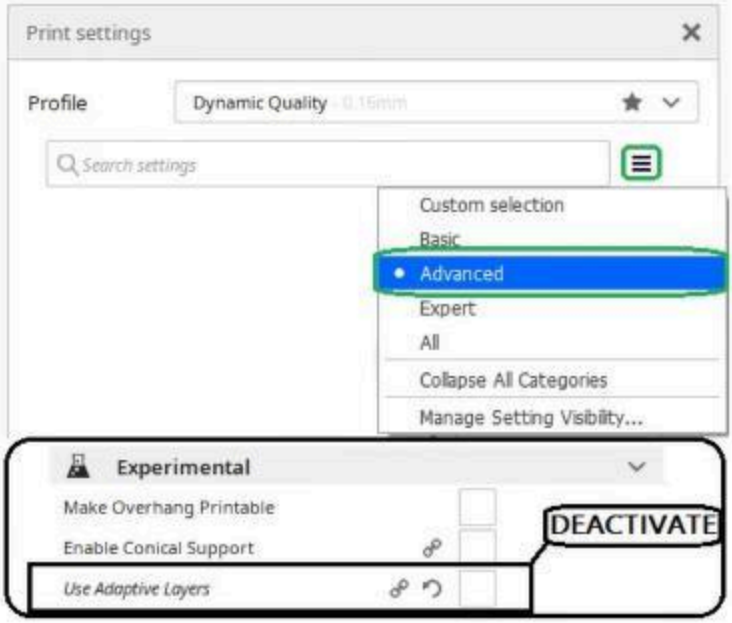
	Hammer
	Fan Speed: 20%
	Generate Support: ☑ Support Overhang Angle: 75°
	Build Plate Adhesion Type: Brim
	NOTE:
	Trigger
	Fan Speed: 20%
	Generate Support: ☑ Support Overhang Angle: 75°
	Build Plate Adhesion Type: Brim
	NOTE:
	Pistol Grip Lid
	Fan Speed: 100%
	Generate Support: ☑ Support Overhang Angle: 75°
	Build Plate Adhesion Type: Brim
	NOTE:
	Pistol Grip
	Fan Speed: 80%
	Generate Support: ☑ Support Overhang Angle: 85°
	Build Plate Adhesion Type: Brim
	NOTE:

	Lower Receiver
	Fan Speed: 50%
	Generate Support: ☑ Support Overhang Angle: 85°
	Build Plate Adhesion Type: Brim
	NOTE:
	Upper Receiver
	Fan Speed: 50%
	Generate Support: ☑ Support Overhang Angle: 80°
	Build Plate Adhesion Type: Brim
	NOTE:
	Buffer Tube
	Fan Speed: 50%
	Generate Support: ☑ Support Overhang Angle: 85°
	Build Plate Adhesion Type: Brim
	The support rod printed with this part should be kept on hand, as it will be used in the assembly of the firearm.
	Stock
	Fan Speed: 80%
	No support
	Build Plate Adhesion Type: Brim
	NOTE:

	Buttplate
	Fan Speed: 80%
	No support
	Build Plate Adhesion Type: Skirt
	NOTE:
	Top Rail
	Fan Speed: 0% / OFF
	No support
	Build Plate Adhesion Type: Brim
	NOTE:
	Magazine Locking Tab
	Fan Speed: 35%
	No support
	Build Plate Adhesion Type: Brim
	NOTE:
	Magazine Base Plate
	Fan Speed: 35%
	No support
	Build Plate Adhesion Type: Brim
	NOTE:

	Magazine Follower
	Fan Speed: 35%
	Generate Support: ☑ Support Overhang Angle: 75°
	Build Plate Adhesion Type: Brim
	NOTE:
	Magazine Body
	Fan Speed: 0%
	NO Support
	Build Plate Adhesion Type: Brim
	NOTE:
	Only for this part, Wall Line Count: 8 REVERT BACK TO DEFAULT VALUE AFTER YOU PRINTED THIS PART!

If you use Cura, make sure that you deactivate the following setting for all parts: "Use Adapative Layers" -> ☐ (Unchecked/Deactivated)



16

Tools, materials and parts

NOTE: A 3D-Printer and related tools are assumed to be already in your possession

Tools

Digital caliper

- A digital caliper that is able to give you accurate measurements

It should be able to display the measurements in millimeters

It is recommended that you buy a high quality caliper such as: Mitutoyo 500-196-30

Recommended source: Amazon, Ebay, Aliexpress, Local hardware store

Power drill

- A power drill

Ideally it should be made by a good manufacturer and be as powerful as possible

Recommended source: Amazon, Ebay, Aliexpress, Local hardware store

HSS-Cobalt drill bit set

- HSS-Cobalt drill bit set with sizes: 1mm, 1.5mm, 2mm, 2.5mm, 3mm, 3.5mm, 4mm, 4.5mm, 5mm, 5.5mm, 6mm, 6.5mm, 7mm, 7.5mm, 8mm, 8.5mm, 9mm, 9.5mm, 10mm

The alloy the drill bits are made out of needs to be:

At least:
HSS-Cobalt M35 (5% Cobalt)
Ideally:
HSS-Cobalt M42 (8% Cobalt)

Recommended source: Amazon, Local hardware store

Extra long 3.5mm drill bit

- 3.5mm HSS drill bit with a length of at least 110mm, ideally longer

Recommended source: Amazon, Local hardware store

Metric socket and bit driver set

- A driver and wrench set that contains metric socket heads and metric hex bits

Recommended source: Amazon, Local hardware store

Metal file

- You need at least one metal file, ideally, you'd get a set of files

The metal file should have a 1 or 2 cut ideally
This means it should have a fairly coarse checkering pattern

Recommended source: Amazon, Ebay, Local hardware store, Aliexpress

Pliers

- Pliers for bending steel wire

Recommended source: Amazon, Local hardware store

Angle grinder

- Vital to make cutting thicker steel stock manageable

Make sure to buy the appropriate metal cutting disc for your angle grinder

Recommended source: Amazon, Local hardware store

Dremel tool

- Rotary/Dremel tool with various inserts. You have to buy the appropriate metal cutting discs!

Recommended source: Amazon, Local hardware store

Soldering iron

- Needed to melt the thread inserts into the upper receiver

Any soldering iron will work, ideally you have access to various tips, of which one should work better for the job

Recommended source: Amazon, Ebay, Local hardware store, Aliexpress, Banggood

Slot screw driver

- Any slot screw driver of small to medium size is appropriate. This will be used to help you remove supports on the 3D-printed parts

Recommended source: Local hardware store

Craft knife

- This will be used to help you remove supports and print imperfections on the 3D-printed parts

Recommended source: Local arts and craft store, Local hardware store

Vise

- A proper full-size vise mounted to a sturdy table

Recommended source: Amazon, Ebay, Local hardware store

Safety glasses

- Safety glasses to protect you especially during usage of the angle grinder

Recommended source: Amazon, Ebay, Local hardware store

Recommended items (Optional):

9x19mm Laser Bore Sighter
to help you adjust your
red dot sight roughly
without the need to shoot.
Sight your red dot with it at a distance of 10, 25 or 50 meters. Watch Youtube Tutorials

Link -> Banggood

9mm cleaning kit
to aid you keeping your barrel
free of obstructions and apply
firearms lubricant/oil
Link -> AliExpress

NOTE: DON'T USE THE METAL BRUSH

Materials

PLA filament

- 2x 1kg spools of 1.75mm diameter PLA filament

Recommended brands:

Chinese:
Hatchbox, eSUN, Sunlu

European:
Prusament, DasFilament, 3DJake

American:
Fusion Filament,3DFuel,Atomic Filament

Use standard black filament as it is produced and used the most, thus the scrutiny in terms of feedback on the quality by the customer is higher on the black PLA of any particular brand

Store sealed as long as possible

Round steel stock (18mm,3mm)

- 1x 50mm long and 1x 216mm long or one piece longer than 300mm, 18mm diameter +-0.1mm

(Ideally you'll have multiple of those pieces in case you make mistakes or want to make multiple bolts. So buy a round steel stock bar of 18mm diameter that is longer than 300mm at least, and then cut it with your angle grinder into pieces as you need it)

- 1x 200mm long or as a longer piece, 3mm diameter +-0.01mm

IMPORTANT FOR BOTH: The round steel stock has to be non-hardened, so no tool steel for example! Uncoated! Use carbon steel (regular steel) ! Any other steels are not recommended. For the Ø3mm stock, stainless steel is acceptable.

Recommended source: Ebay, Local industrial metal supplier

JB Weld

- 2x packages of JB Weld

This is a two-part epoxy that is used to glue materials of all sorts together especially metals. Get the regular JB weld version

If you can't get JB weld try to find a similar product that is a two-part steel bonding epoxy/glue

Recommended source: Amazon, Ebay, Local hardware store

Threadlocking fluid 243/242

- Small bottle of Loctite 243/242

Recommended source: Amazon, Local Hardware store, AliExpress (Last resort)

AliExpress link:
aliexpress.com/item/4000015095892.html

Sand paper

- Get multiple sheets of coarse to medium grain sand paper

Recommended source: Local hardware store, Amazon, Ebay

Razor blades

- At least 1x disposable thin razor blade

This is potentially needed to install the 3mm shaft collars in case they come with slot instead of hex key screws

Recommended source: Local grocery store, Local drug store

Cutting fluid

- At least 1x spray can or bottle of cutting fluid

It is used to cool and lubricate during drilling, threading and other processes that remove metal

Recommended source: Amazon, Ebay, Local hardware store

Grease

- 1x small container of grease for mechanical lubrication applications

Recommended source: Amazon, Ebay, Local hardware store

Tooth picks

- 1x small container of tooth picks

This will be used to mix and apply JB Weld

Recommended source: Grocery store, Local drug store, Local hardware store

Welded Bolt specific tools and materials (ONLY NEEDED FOR WELDED BOLT OPTION):

Sheet metal plates

- 1x 3-5mm thick sheet metal plate, at least 500x500mm big

Put that plate on any regular table to have a table ready to be used for your welding

You will need that sheet metal plate on top of a regular table in case you don't have a welding table that has been specifically made for welding

- 1x 1mm thick sheet metal plate, at least 700x700mm big. Put that plate on the floor around the part of the regular table you will weld to protect the floor.

- 1x 3-5mm thick, 20mm wide sheet metal strip cut to 100mm length to help you align the bolt pieces during welding

NOTE: These sheet metal materials are not necessary but highly recommended if you are new to welding and did not have the facilities and tools to weld.

Recommended source: Ebay, Local industrial metal supplier

Stick welding electrodes

- Assortment of welding electrodes

Ideally 2.5mm in diameter.

BUY DIFFERENT TYPES OF STICK WELDING ELECTRODES FROM DIFFERENT BRANDS!

Some steel welding electrodes might work better than others for the steel you are working with. This is key.

Recommended source: Amazon, Ebay, Local hardware store.

Stick welding unit

- A cheap and simple stick welding unit that is also known as SMAW(Shielded Metal Arc Welding) or simply arc welding unit

They can cost from anywhere between 50 and 100 USD

Recommended source: Amazon, Ebay, Aliexpress, Local hardware store

Welding helmet

- A welding helmet is important to have to be able to weld without going blind

Recommended source: Amazon, Ebay, Aliexpress, Local hardware store

Welding gloves

- Purpose made leather gloves to prevent burning your hands during welding

Recommended source: Amazon, Ebay, Local hardware store

Welding apron

- An apron to protect you against burning yourself while welding. Made out of leather or leather substitute

Recommended source: Amazon, Ebay, Local hardware store

Welding clamps

- 1-2x welding clamps to help you during the welding of the bolt. Make sure the welding clamp is of the type you see in the picture

Recommended source: Amazon, Ebay, Aliexpress

Slag hammer

- Hammer to help you get rid of the slag that forms during the welding process

Recommended source: Amazon, Ebay, Aliexpress

Metal wire brush

- Brush with metal wires to help you clean welding seams

Recommended source: Amazon, Ebay, Ali

express

Weldless Bolt specific materials (ONLY NEEDED FOR WELDLESS BOLT OPTION):

Extra 3mm drill bit

- At least one extra 3mm drill bit

Square steel stock

- Square steel stock 10x10mm Get a bar of at least 100mm length.

Woodworking clamp

- A woodworking clamp that is similar to the example in the picture

Recommended source: Ebay, Amazon, Hardware store

Fire control group components

In regards to the fire control group you have two options.

For most people the FGC-9 is intended to be built by, you will most likely rely on the printed fire control group but if you have access to proper firearm parts it is recommended you buy a commercial AR-15/M4/M16 compatible fire control group. A proper commercially made AR-15 fire control group will be safer and vastly more reliable. So if you can get one, go with a proper AR-15 fire control group. Depending on your choice, you will have to buy different parts.

Parts for use with the 3D-printed FGC-9 MkII fire control group:

In order of image shown above, from left to right:
- 1x AR-15 Hammer spring
- 1x Steel Dowel Pin, 4mm diameter, 28mm +-2mm long, Recommended Spec/Type: DIN 6325 or DIN 7
- 1x AR-15 Trigger spring
- 1x AR-15 Fire control group pin
- 1x AR-15 Disconnector spring
- 1x AR-15 Fire selector spring
- 1x AR-15 Fire selector detent

Available from Aliexpress:
www.aliexpress.com/item/32916890199.html
www.aliexpress.com/item/1005001538560272.html (21 pcs option)
www.aliexpress.com/item/33008262340.html (T070 option)
www.aliexpress.com/item/33018833744.html (21 pcs option)
www.aliexpress.com/item/1005001451650916.html

Note: For the 4mm DIA, 28mm long dowel pin, look on Ebay, etc. In addition, a slot screw and socket screw are needed which are listed on page 31-32.

General parts

Shaft collars DIN 705

- 3x Shaft collars DIN 705, 16mm
Inner diameter: 16mm
Outer diameter: 28mm
Width: 12mm

- 1x Shaft collar DIN 705, 3mm
Inner diameter: 3mm
Outer diameter: 7mm
Width: 5mm
(Should include a set screw)

Alternatively, equivalent shaft collar:
Inner diameter: 3mm
Outer diameter: 7mm-12mm
Width: 5mm

Recommended source: Ebay, Regional online fastener supplier

Cup point set screws DIN 916

- 3x Set Screw M6 DIN 916, 6mm

Recommended source: Ebay, McMaster, Regional online fastener supplier

Main Buffer Spring

- 1x AR-15/M4 Buffer Spring

Recommended source: Aliexpress, Ebay

Available on Aliexpress:

www.aliexpress.com/item/33050087682.html
www.aliexpress.com/item/4001109286597.html
www.aliexpress.com/item/4001053158030.html

Firing Pin Spring

- 1x Spring for the Firing Pin

Remove springs from various ballpoint pens that you have and check them whether they meet these dimensions.

Outer diameter: 4.5mm +-0.5mm
Wire thickness: 0.4mm +-0.02mm
Initial length: 25mm +-5mm

Alternatively you can purchase a spring with those dimension online.

Once you have a spring that meets the dimensions above, cut the spring down to a length of 12.5mm +-5mm

Mag Catch Spring

- 1x AR-15 Mag Catch spring

(Most likely already included in your fire control group spring kit ordered from Aliexpress)

Cut shorter at your own preference in case the mechanism is too stiff for you

OR

1x Regular compression spring

Outer diameter: 8mm
Wire thickness: 1mm +-0.1mm
Length/Cut to length: 20mm

Secondary Buffer Spring

- 1x Secondary buffer spring:

Outer diameter: 17mm
Wire thickness: 2mm +-0.5mm
Length: 80mm +-10mm

DIN 2095 option: Outer diameter:17mm
Wire thickness: 2.25mm
Length: 75mm

Recommended source: Ebay, AliExpress

Available on Aliexpress:

www.aliexpress.com/item/4000436939383.html
www.aliexpress.com/item/1005001633110330.html

Hex head screws DIN 933

- 6x Hex Head Screw M3 DIN 933, 40mm

- 4x Hex Head Screw M3 DIN 933, 20mm

Recommended source: Ebay, McMaster,
Regional online fastener supplier

Socket head screw DIN 912

DIN 912 Socket Head Screws:

- 10x Socket Head Screw M3,16mm

- 1x Socket Head Screw M3,20mm

- 1x Socket Head Screw M3,12mm

- 1x Socket Head Screw M3,30mm
  Cut to 28mm length
(Only needed for the 3D-printable
Fire Control Group)

- 1x Socket Head Screw M4,30mm

- 1x Socket Head Screw M6,25mm

Recommended source: Ebay, McMaster,
Regional online fastener supplier

Slot head screw DIN 84

- 1x Slot Head Screw M4 DIN 84, 6mm
(Only needed for 3D-printable fire control group)

Recommended source: Ebay, McMaster, Regional online fastener supplier

Washers DIN 125

- 10x Washer M3 DIN 125

Recommended source: Ebay, McMaster, Regional online fastener supplier

Nuts DIN 934

- 4x Nuts M3 DIN 934

Recommended source: Ebay, McMaster, Regional online fastener supplier

Lock washer DIN 6797

- 1x External-Tooth Lock Washer M6 DIN 6797

Recommended source: Ebay, McMaster, Regional online fastener supplier

Thread inserts

- 4x "Brass Hot Melt Inset Nuts SL" M3 "M3 X D5.0 X L7.0"

OR

Generic Thread Inserts M3
(Ideally with diagonal knurling)
Outer diameter: 5mm
Width/Length: 5-7mm

Available on Aliexpress:

www.aliexpress.com/item/4000232858343.html

www.aliexpress.com/item/4000826134336.html

Extended G17 Mag Springs

- (7x+) 1x per Mag that you want to make

Available from Aliexpress:
www.aliexpress.com/item/4000036186924.html ("For G17/Color B" Option)

https://www.aliexpress.com/item/4001268513095.html ("Glock 17" Option)

https://www.aliexpress.com/item/4000845210385.html ("Glock 17" Option)

NOTE: These springs are only compatible with 17rd and 25rd 3D-printed magazines

With high likelihood you will need to modify the springs before they work in the 25rd 3d-printed FGC-9 MkII magazine.

The modification guide is on page: 124

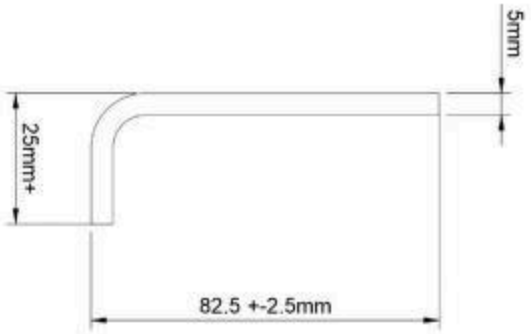
Hex/Allen L-Key Size 5mm

- 1x 5mm Hex/Allen L-Key

Recommended source: Ebay, McMaster, Regional online fastener supplier

You might have to cut the longer leg to meet these dimensions:

Overall length: 82.5mm +-2.5mm
Short leg: 25mm+



Neodymium Magnet

- 1x Neodymium Magnet 20mmx10mmx2mm

Recommended source: Ebay, Amazon

Recommended accessories

Silicone spray

- Silicone lubricant spray for the surface of all 3D-printed parts that interact with each other

Recommended source: Ebay, McMaster, Regional online fastener supplier

NATO firearms lubricant

- To prevent rust inside the barrel

Sold under following designations:
NATO S-761 / NATO S-758 / W18

Recommended source: Ebay, Automotive oils shop, Hardware store

Red dot sight

- Red dot sight

Suggested option:

https://www.aliexpress.com/item/4000310643707.html

Weapon mounted flashlight

- Weapon mounted flashlight

Suggested option:

https://www.aliexpress.com/item/3286490230000.html

Single point bungee sling

- Ideal sling for the FGC-9 MkII

Suggested option:

https://www.aliexpress.com/item/1000034833275 9.html

Ammunition

You will most likely not have access to 9x19mm ammunition, thus you will need to assemble/reload your own 9x19mm cartridges.

Europeans at time of the publication of this document, are still able to buy all necessary components and tools without the need for any licenses.

For assembly/reloading you will need reloading tools.

Included with the files is a guide written by IvanTheTroll that explains how to assemble your cartridges with improvised tools, but if you are able to buy the reloading tools, you should use the proper reloading tools instead for reliability and faster production rates.

The following components are needed for 9x19mm cartridges:

Projectile

Case

Primer

Source of Powder

To help you find these components in the case that you live in Europe, use the following terms in your search:

- Projectiles, Shipped from Czech Republic, Austria or Germany: (9mm/.355/.356) ".355 FMJ RN" or "9mm FMJ RN"
- Cases, Shipped from Poland: "Łuski 9x19mm" or "Łusek 9mm"

  Cases, Shipped from Germany: "Hülsen 9mm" or "Hülsen 9mm gebraucht"

  Cases, Shipped from UK: "Deactivated 9x19mm"

  Cases, Shipped from Czech Republic: "Nábojnice 9mm"
- Small Pistol Primers, Shipped from Italy: "Inneschi primers IT"
- 6.8/11 RED HILTI blanks: "Hilti 6.8/11 Red"
  Contain 0.23grams NC powder per blank !
  Buy hundreds at least, better thousands if you can !

NOTE: If you are unable to acquire proper primers, you will need to resort to reloading the "indented" / already fired primers inside old cartridge cases. This means, if you can't buy primers you will need to make sure that the cases you use, have the already fired / indented primers still inside the pocket, because you will have to resort "reloading" them with primer compound harvested from the Hilti blanks. This is explained in the included ammunition guide by IvanTheTroll.

NOTE: Regarding the amount for loading 9mm cartridges with HILTI powder, don't follow the suggestion to use 3.5gr HILTI powder. The ammo guide is outdated in that regard.

For ideal operation of your FGC-9 you should use 9x19mm cartridges with either 147grain RN(round nose) bullets or 124grain RN bullets:

147 grain Round Nose

- Ideal for Suppressor use
- Full Metal Jacket or Plated
- Use 0.28 grams / 4.3grains of powder harvested from HILTI 6.8/11 RED nail gun blanks
- Load to Overall length (OAL) of the cartridge: 28.90mm +-0.05

124 grain Round Nose

- Better suited for long distance fire
- Full Metal Jacket or Plated
- Use 0.27 grams / 4.2grains of powder harvested from HILTI 6.8/11 RED nail gun blanks
- Load to OAL: 28.90mm +-0.05

For those who are able to buy reloading tools, here a recommended setup:

LEE Breech Lock Press 90045

LEE 4-DIE Carbide Set 9mm 90963

LEE Powder Measure 90058

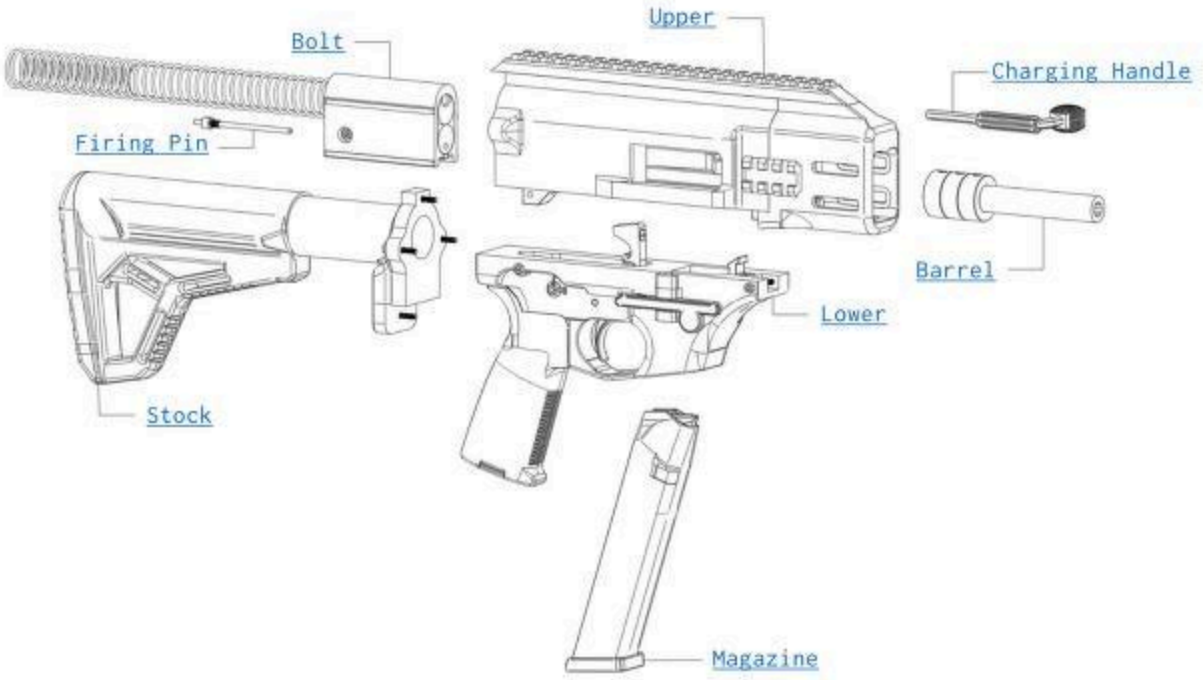
LEE New Auto Prime 90230

LEE Shell Holder #19 90023

Scale with 0.01gram accuracy

Learn via Youtube tutorials extensively before starting. Watch this video as an introduction: https://www.youtube.com/watch?v=hXh4GpmdJOg

Visual overview of the components



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Making the barrel

You have three options to produce your FGC-9 barrel.

- Electro-Chemically Machining a hydraulic pipe

  Buy a 16mm Outer Diameter, 8-8.6mm Inner Diameter
  Hydraulic Pipe / “Explosion-Proof-Pipe”, out of hardened steel
  and use “ECM” to bore, rifle and chamber it according to the
  included instructions. (USE THE INCLUDED ECM GUIDE)

  Recommended option, All necessary information is included

  Don’t be intmidated by this process.
  This process is very easy to reproduce even as a lay person
  thanks to the help of the included instructions.
  The tools that are necessary are cheap and available worldwide.

- Using a simple steel pipe chambered with a drill bit

  Buy a 16mm Outer Diameter, 9mm Inner Diameter steel pipe and
  cut it to at least 114mm length and
  then use a 10mm diameter drill bit that you cut flat beforehand,
  to ream the chamber to a depth of 15.95mm +-0.05.

- Machining a barrel out of a rifled barrel blank

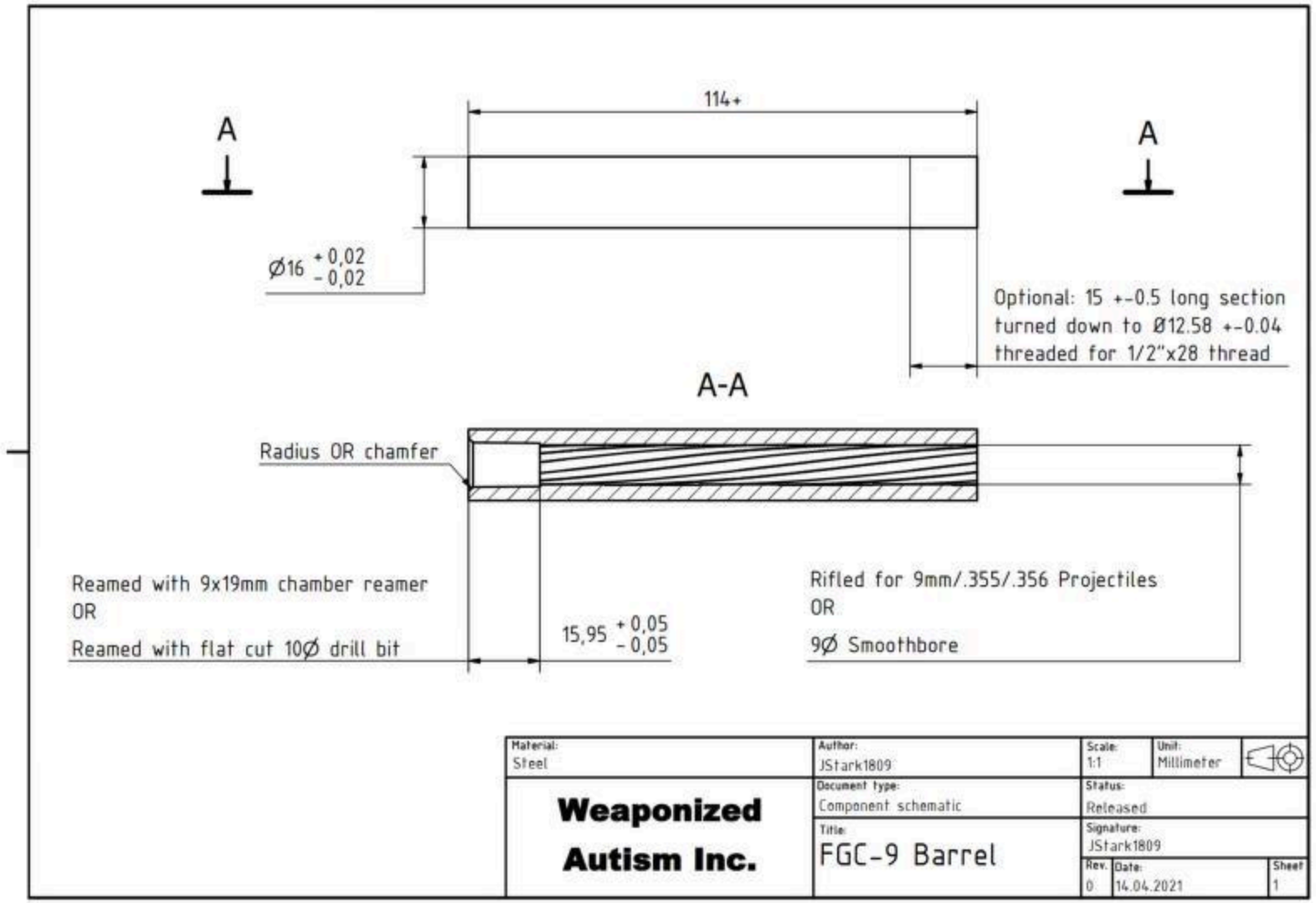
  Hire a gunsmith to do the following or do this yourself:

  - Buy a rifled barrel blank for 9x19mm
    (In the US, for example on Brownells)
  - Cut a 114mm+ section from the long piece
  - Turn down the piece on the lathe to the OD of 16mm+-0.02
  - Use a 9x19mm chamber reamer to ream the chamber to a depth
    of 15.95mm +-0.05
  - Add a chamfer with a tool or use sand paper to add a radius
  - (Optionally) Follow instructions on page 42 for muzzle thread

  If you decide to machine a barrel from a rifled barrel blank
  yourself, you can buy the same tools shown on page 42 for this.

  The only additional tools you will need is a
  9x19mm chamber reamer with a square shank and
  a M5/M6 - M20 adjustable tap wrench.

  The basics of the chamber reaming process are illustrated in
  this video: https://youtu.be/27Xz_oMZbbI?t=199


A
A
114+
Ø16 +0,02 -0,02
Optional: 15 +-0.5 long section
turned down to Ø12.58 +-0.04
threaded for 1/2"x28 thread
A-A
Radius OR chamfer
Reamed with 9x19mm chamber reamer
OR
Reamed with flat cut 10Ø drill bit
15,95 +0,05 -0,05
Rifled for 9mm/.355/.356 Projectiles
OR
9Ø Smoothbore
Material: Steel
Author: JStark1809
Scale: 1:1
Unit: Millimeter
Weaponized Autism Inc.
Document type: Component schematic
Status: Released
Title: FGC-9 Barrel
Signature: JStark1809
Rev. 0
Date: 14.04.2021
Sheet 1

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Suppressor

For tactical purposes during the usage of the firearm and for being able to practice shooting and test fire in environments in which you need to be quiet, you might consider the use of a suppressor.

There are a multitude of suppressor options that can be freely bought and only need minor modification for use with your firearm.

They key issue that you will face with your FGC-9 is how to attach your suppressor to your barrel.

At the moment you have effectively two methods of attaching a suppressor to you FGC-9.

One will only require you to purchase an adapter that will let you attach the suppressor while the other option is more involved and will require access to a lathe.

Going with the more advanced option has the benefit of keeping the length of your suppressed setup as short as possible, as well as making sure that the suppressor is securely attached to your firearm.

A suppressed setup with the adapter will require caution during use, as the adapter and thus suppressor might get knocked off your barrel.

1. Adapter option:

Buy this exact 1/2x28" adapter that allows you to mount it to 16mm OD barrels: www.aliexpress.com/item/4000800532350.html (For 16mm Barrel)

16mm

with 1/2-28 Thread

NOTE: YOU WILL NEED TO DRILL THE INSIDE OF THE ADAPTER TO AN INNER DIAMETER OF 9mm with your 9mm drill bit !!!

- It is attached to your FGC-9 barrel via two set screws that you will tighten with the included Allen key

- There are a multitude of similar adapters on AliExpress but only the one shown in the picture will fit with your barrel

- In case this adapter is not available anymore, refer to the Deterrence Dispensed community for alternatives

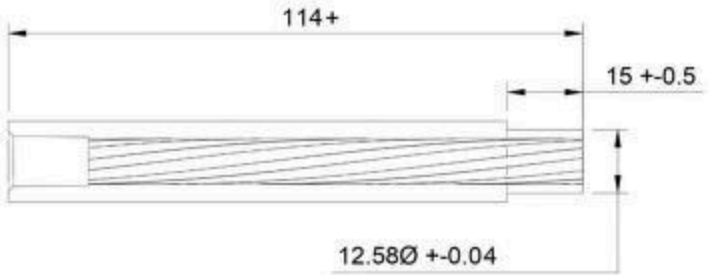
2. Robust and more compact option:

- Buy a mini lathe such as the SIEG C2 or a 7" x 14" Mini Lathe
  Example Link
- Buy a MT2 / MK2 live center tool
  Example Link
- Buy a 8x8mm carbide tool holder and compatible carbide inserts (CCMT060204)
  Example Link
- Buy a Thread Alignment Tool (TAT) for 1/2" x 28 thread for use with 9mm
  Example Link 1 Example Link 2
- Buy a 1/2" x 28 thread die that has an outer diameter of 1.5" / 38mm
  Example Link 1 Example Link 2
- Buy an adjustable die holder for use with 1.5" / 38mm OD dies
  Example Link 1 Example Link 2

NOTE: Do not install your shaft collars onto the barrel until you have completed the muzzle thread cutting process.

Reducing the last 15mm section on your barrel to an OD of 12.58mm with the lathe:

1. Set up your lathe with the live center and one of your carbide tools.
2. Insert the chamber end of the barrel into the chuck and have the muzzle butt against the live center mounted in the tailstock of your lathe.
3. Turn the 15mm section near the muzzle to an outer diameter of 12.58mm +-0.04.
4. Take many light cuts, do not remove too much material at once and make sure you measure the OD after every few cuts to prevent reducing the OD too much.



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Cutting the muzzle thread with your threading die and TAT tool:

1. Screw the TAT about 4-5 threads into the back of the die with the pilot sticking out in front.

2. Insert die and TAT into handle, preferably lettered towards you and aligning at least one of the tightening screws in the handle with the divots in the die OD.

3. Secure the barrel vertically in a padded vise.

4. Apply a good cutting fluid/oil to the die teeth and start cutting.

It will take a little bit of vertical downward pressure to get started. Apply even downward pressure and rotate the die slowly.

5. Repeatedly advance the die about 1/8 turn, then back it off to break up the shaving (chips).

Do not allow the face of the TAT to ever reach the barrel face.

This could strip the teeth out, possibly damaging the TAT and ruining the few threads that you have cut on the barrel.

6. Once you have cut about 4-5 threads remove the TAT tool.

7. Resume threading as above, breaking the chips and applying cutting fluid as you go.

Suppressor selection:

There are two kinds of suppressors you have access to.

One are the so called monocore suppressor and the kind that have multiple cups and a spacer inside.

Monocore suppressors that you can buy offer the advantage that you don't need to drill cups but the monocore suppressor that are available have bores with diameters of around 12mm. The smaller the bore of a suppressor is the more effective at suppression it will be.

The suppressor that come with cups will require you to drill through the cups with a 10.5mm drill bit.

Thus these monocore suppressors are less effective at suppressing the sound of your shots.

Note that any suppressor choice will need to have an outer diameter of at least 1.2 inch, as those that are slimmer in diameter tend to be not suited to the pressures created by the 9x19mm cartridge.

When it comes to length, the longer the suppressor is, the more effective at sound suppression it will be. A longer suppressor will become an issue though when handling your firearm inside buildings.

Cup Suppressor – 10 inch

Current recommended sources:

www.aliexpress.com/item/33032405060.html

www.aliexpress.com/item/4000975392649.html

NOTE: You will need to drill open all cups as well as the endcap with a 10.5mm drill bit. Make sure that you drill perfectly through the center.

How to stack the spacer and cups:

Barrel End **Spacer** **Cups** **Endcap End**

Note: Drill cups and endcap open with a 10.5mm Drill Bit

Monocore Supressor – 6 inch

Current recommended sources:

www.aliexpress.com/item/4000814859660.html

www.aliexpress.com/item/1005001450369678.html

NOTE: You will need to drill open the endcap with a 10.5mm drill bit. Make sure that you drill perfectly through the center.

Monocore Supressor – 10 inch

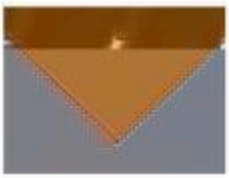
Current recommended sources:

www.aliexpress.com/item/1005001450369678.html

www.aliexpress.com/item/4001145063246.html

NOTE: You will need to drill open the endcap with a 10.5mm drill bit. Make sure that you drill perfectly through the center.

Recommended: To increase the suppression effect of your suppressors cut out an appropriately size disc out of a 3mm sheet of "Polyurethan sheet PU90° Shore" and insert it into the endcap. Cut the disc just slightly larger than the inner diameter of the inside of the endcap to push it in to have it stay stuck inside. After the first shot, your bullet will create its own exit hole.
Make sure you don't use any hollow point bullets for the first few shots.
If you can't assemble your suppressor this way, sand the last cup / the monocore shorter until the suppressor can be assembled.



If you cut threads into your barrel with the "lathe+die" option, consider:

Muzzle thread protector (15mm length)

Example links:

www.aliexpress.com/item/4001360255712.html
www.aliexpress.com/item/32903441874.html (Choose:.223)

Making the charging handle

Gather the barrel retainer, charging handle, charging handle bushing, the 20x10x2mm magnet, 5mm allen key and prepare the JB weld mixture.

Apply the JB weld mixture to the bend of the Allen Key.

Making sure the JB weld mixture is applied primarily in the area shown in the picture, shove the bushing over the allen key and make sure that you push it AS FAR AS YOU CAN, before letting the charging handle dry.

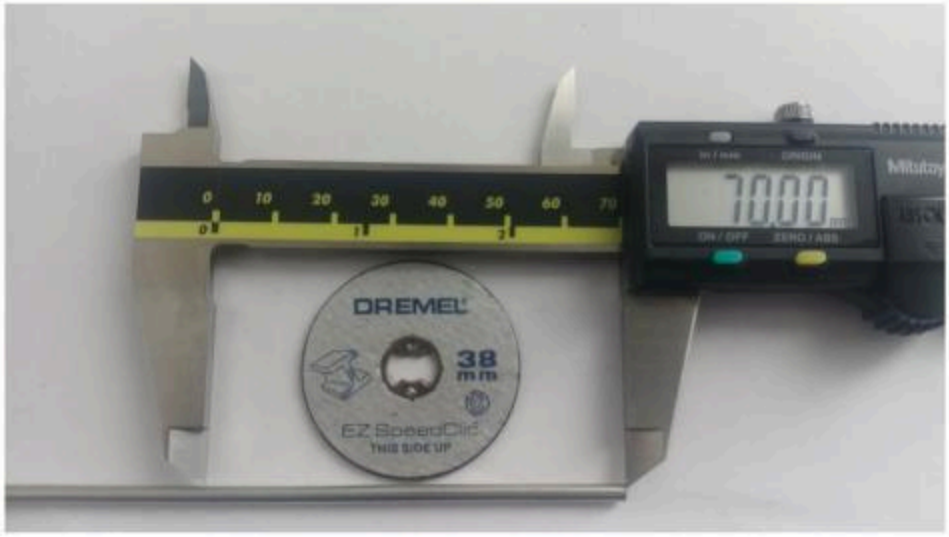
Once you have the bushing pushed up on the bend of the allen key you can then apply JB weld into the cavity of the charging handle knob and then push it over the shorter leg of the allen key in the orientation shown in the picture.

Let the charging handle dry for at least 6 hours before further use.

Note: When using the charging handle you might at first chip away some material from the corner of the barrel retainer. This is normal.

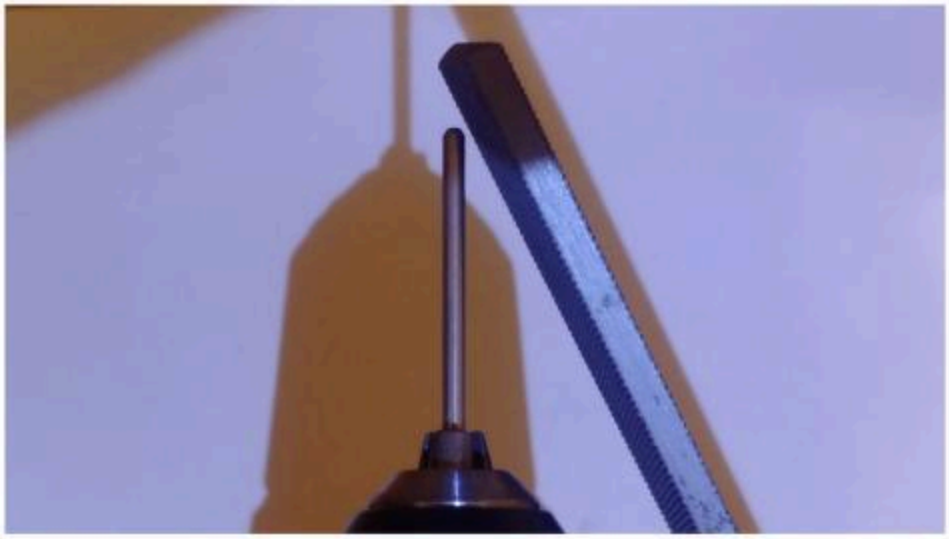
While the charging handle is already drying, you can apply JB weld into the charging handle slot of the barrel retainer and then drop the magnet in.
Make sure you clean the main surface of the magnet with a cotton swab or something similar to simply have that surface stay clean from any JB weld before letting it dry.

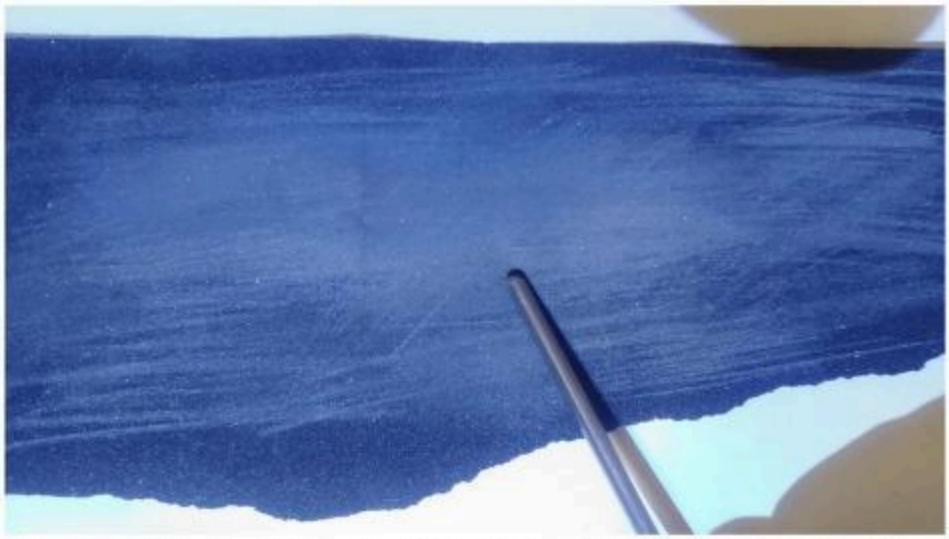
Making the firing pin



Cut off a 70mm long piece from your 3mm DIA steel bar with a Dremel tool /angle grinder with a steel cutting disc.

Make sure to remove any nasty edges by using sand paper or your metal file before inserting it into the power drill in the next step.





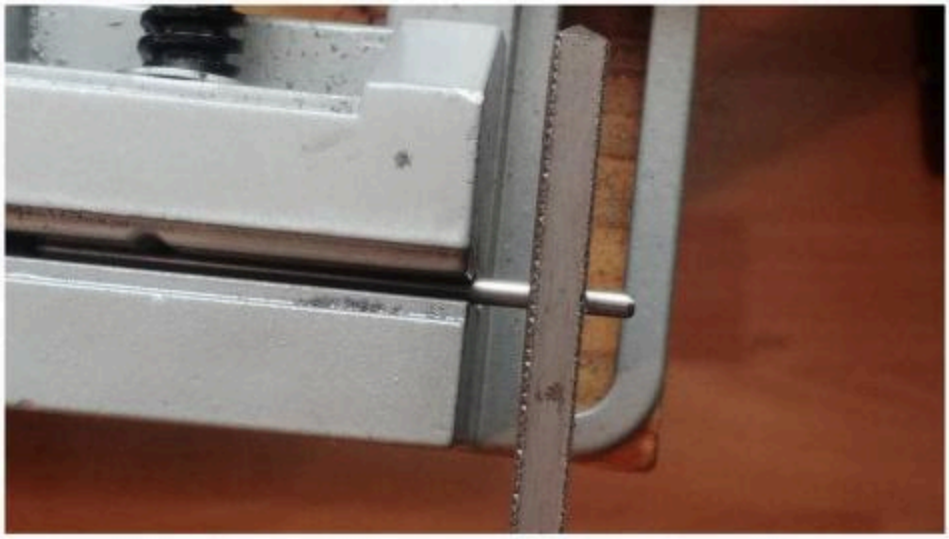
Put the bar into a power drill and rotate it while holding a metal file against it to form a chamfered circle end at the tip that is 2mm in diameter.

Then use sandpaper to finish the shape of the tip so that it looks like in the picture.

After you made sure the circle end point is 2mm in diameter, you then can approach to get the circle end point to the final diameter of 1.75mm by carefully grinding the tip against sandpaper.
Make sure to hold the bar straight down.

Use your caliper blades to scratch a line around the circumference of the bar at a distance of 58.35mm from the tip.

At that exact distance you will have to drill a divot into the pin later on so make sure you have that spot marked by having a clearly visible belt at the distance of 58.35mm from the tip.



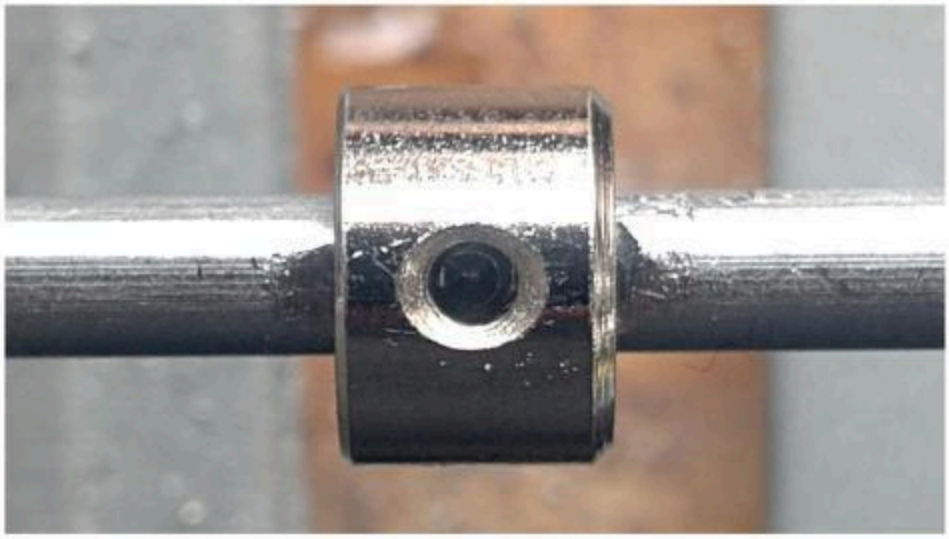
Put the bar into a vise and use the edge of your metal file to create a flat section around the previously marked position.

Only file so much that you have a flat area to drill into for the divot later on.

Use your power drill and a 1mm drill bit and then afterwards go deeper with a 2mm drill bit, to create a divot deep in the bar that is in the center of the flat area you created, that is aligned with the previously created line which is 58.35mm from the tip.

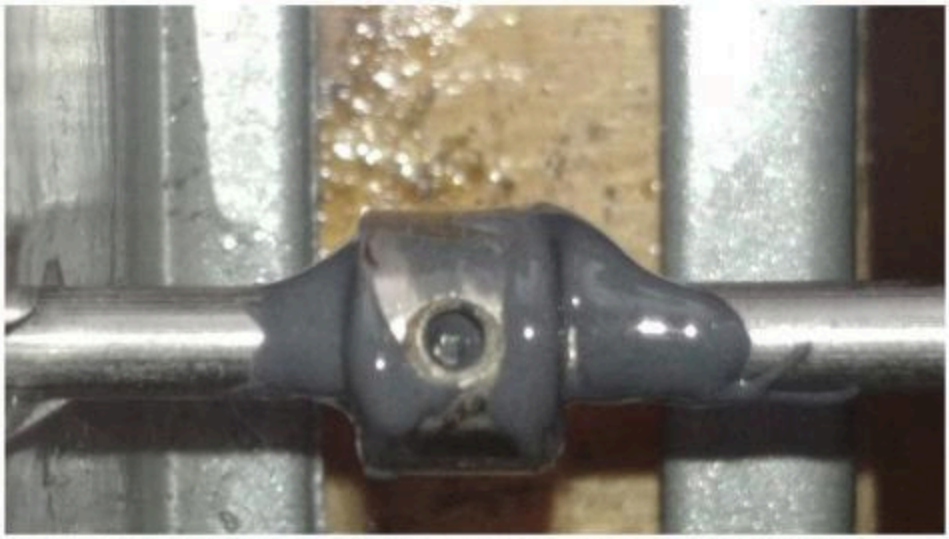
Instead of the 1mm drill bit you can also use a punch and a hammer to mark the spot before using the 2mm drill bit.

Note: The divot is not center in the picture. You should do a better job than that ;)

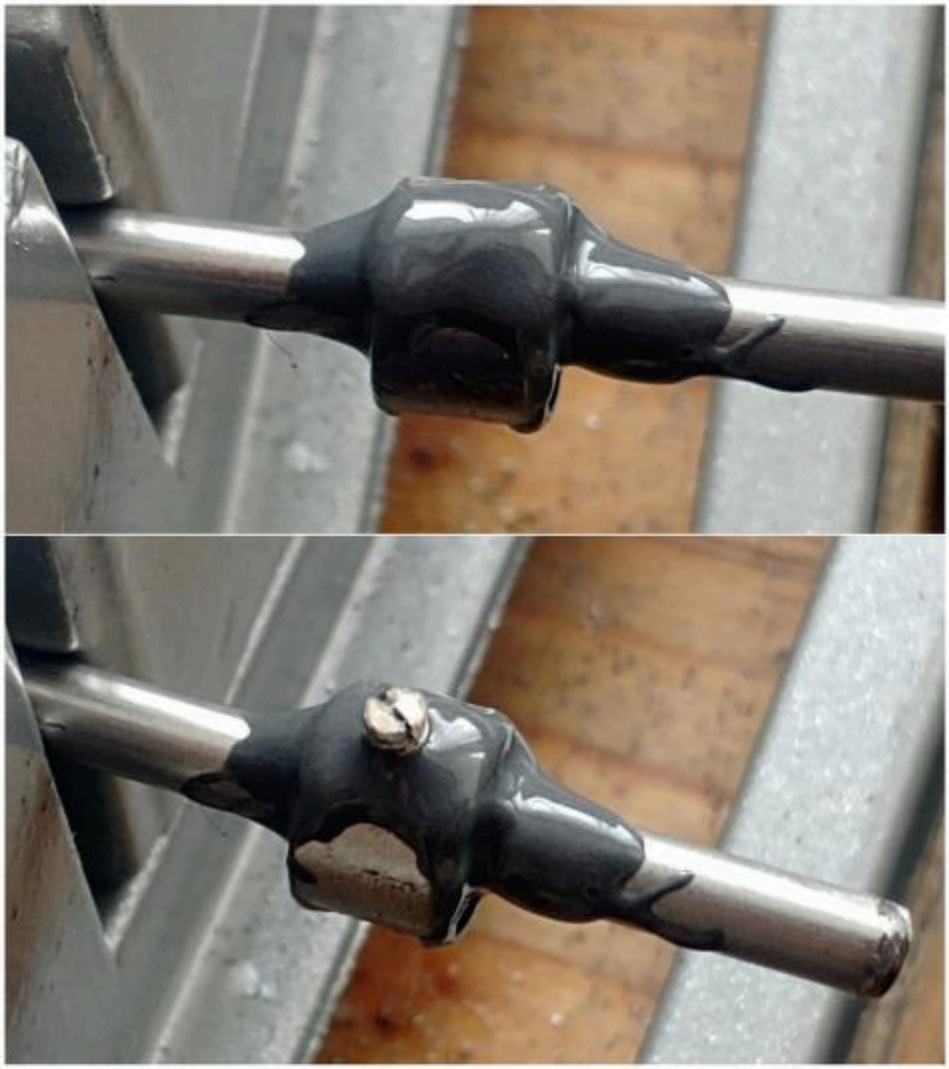


Remove the grub screw from the shaft collar and put the shaft collar onto the bar aligning the hole of it with the divot to get an idea where the shaft collar should be for the later steps.

Mix up some JB weld with a tooth pick.



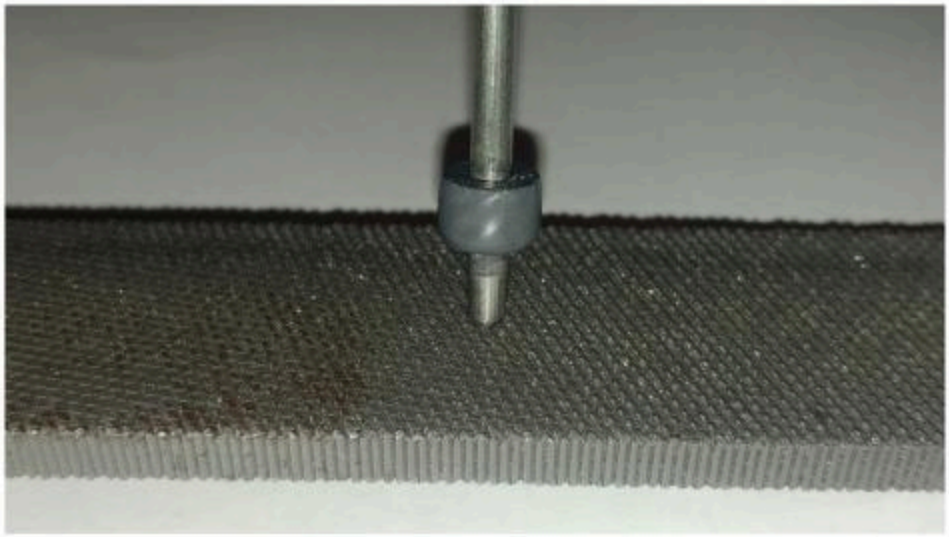
Remove the shaft collar and put some JB Weld onto the flat area that you filed and fill up the drilled divot.
Then slide the shaft collar to that position and try to line up the hole with a tooth pick through the hole of the shaft collar.
Try to remove the JB weld out of the shaft collar screw hole so you can see that the shaft collar hole is centered with the divot.



Once you have made sure the shaft collar screw hole is lined up with the divot you previously created by probing with a toothpick, you can fill the hole with JB weld. Be careful not to move the shaft collar away from its position at this point.

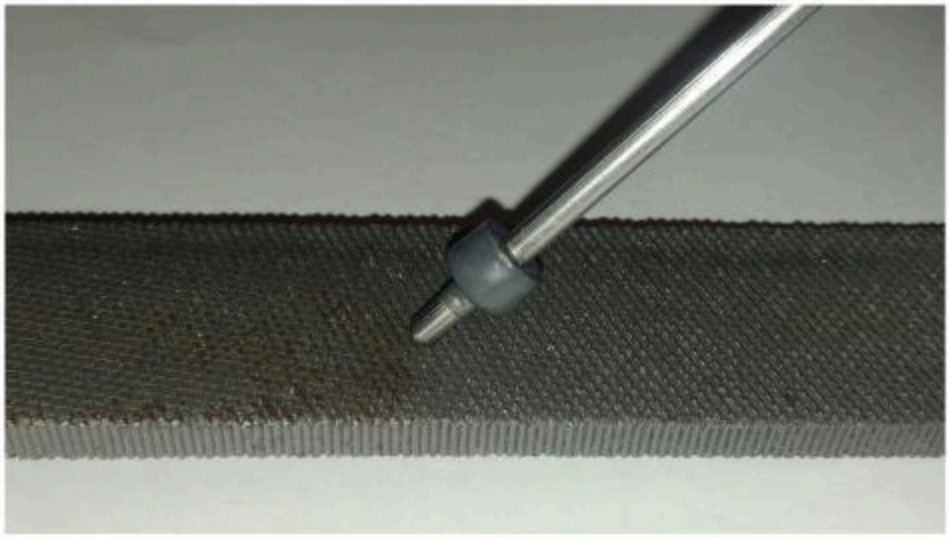
Take a razor blade or the the hex key depending on your type of 3mm shaft collar and apply a drop of grease along the shorter edge of the tool to have the grub screw stick to it. Screw the grub screw into the JB Weld-filled shaft collar screw hole. Cover the entire shaft collar and the area behind the shaft collar with JB Weld.

Clean the flat side of the shaft collar that is towards the tip from any JB weld. After you have applied JB weld and cleaned it from the places that should be free of JB weld, as you can see in the picture, let the firing pin cure in a vertical position for at least 24 hours.



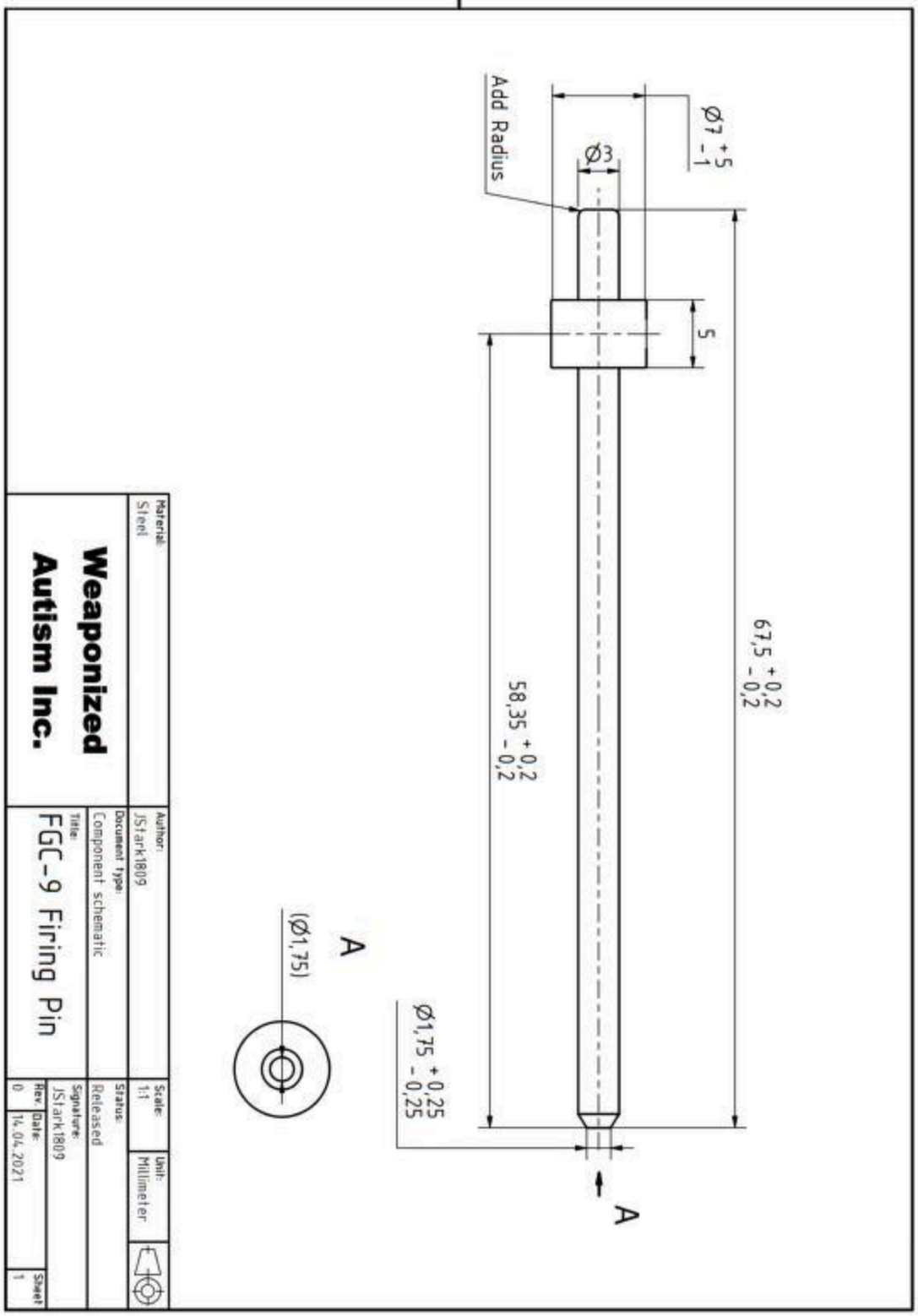
Using a metal file shorten the firing pin by grinding the back end of the firing pin to reach an overall length of 67.50mm.

Make sure to do this carefully and measure often during the filing process.



After you reach the final length, chamfer the end of the back a little as you see in the picture.

As noted on page 65, once you have completed making the bolt, you will have to check the firing pin protrusion distance, as show in the illustration, once that check is complete, the firing pin is ready for use in the assembled firearm with live ammo.


Add Radius
Ø7 +5 -1
Ø3
5
67,5 +0,2 -0,2
58,35 +0,2 -0,2
Ø1,75 +0,25 -0,25
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Material:
Steel
Author:
JStark1809
Scale:
1:1
Unit:
Millimeter
Weaponized Autism Inc.
Document type:
Component schematic
Status:
Released
Title:
FGC-9 Firing Pin
Signature:
JStark1809
Rev:
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Date:
14.04.2021
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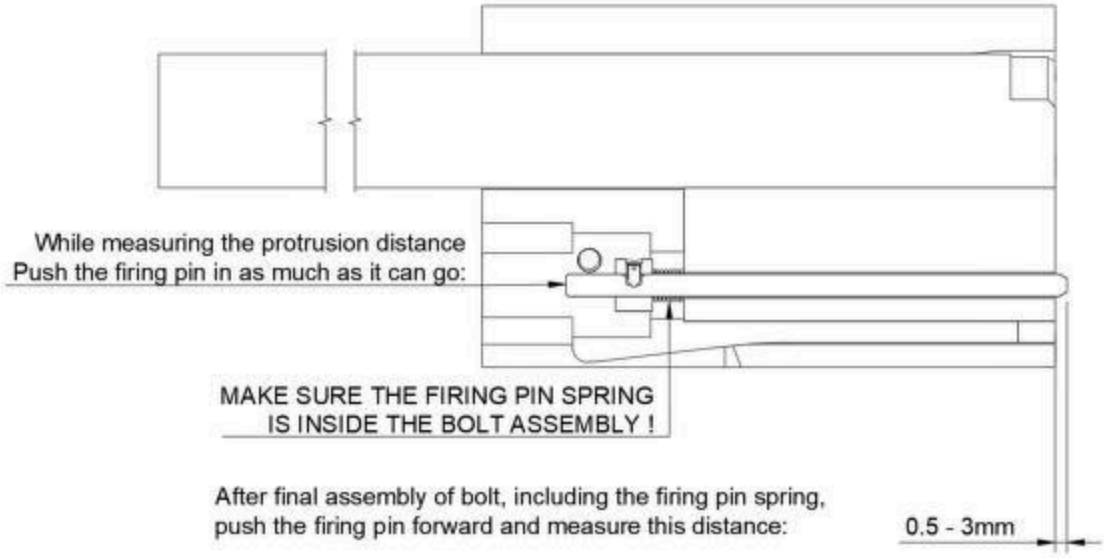
NOTE, FOR LATER, WHEN YOU FINISHED MAKING THE BOLT !

After you have made your firing pin and the bolt assembly has been made, measure the protrusion distance of the firing pin tip to the bolt face:

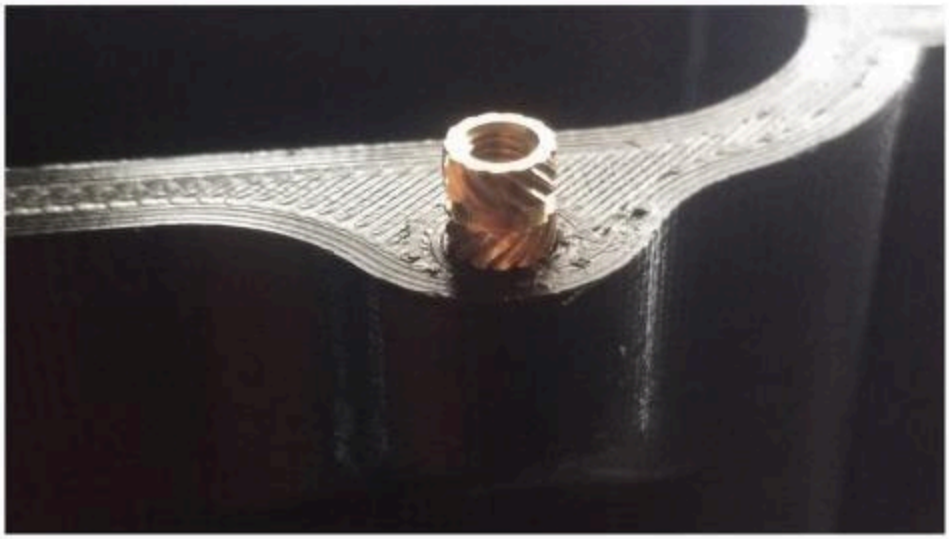

While measuring the protrusion distance
Push the firing pin in as much as it can go:
MAKE SURE THE FIRING PIN SPRING
IS INSIDE THE BOLT ASSEMBLY !

After final assembly of bolt, including the firing pin spring, push the firing pin forward and measure this distance: 0.5 - 3mm

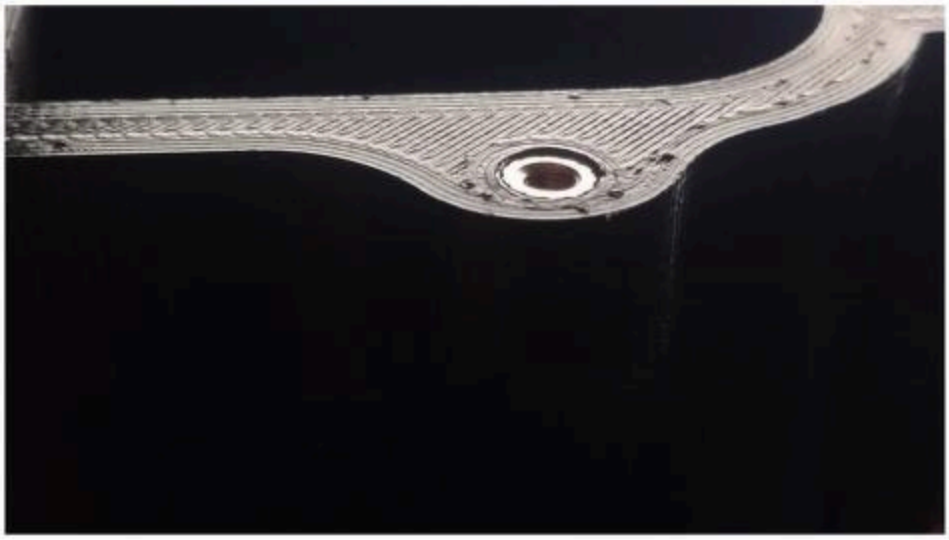
At the absolute minimum 0.5mm!
If it is shorter -> Make a new firing pin!

At absolute maximum 3mm!
If longer -> Shorten slightly from the tip!

Melting in the thread inserts



Prepare all four thread inserts as well as the upper receiver and lower receiver. Get your soldering iron and pre-heat it to at least 220°C. Put the thread inserts with the tapered side into the holes on the back side of the upper and lower receiver.



Making sure the inserts can go down in straight, use your soldering iron to push in the thread inserts about 1-2mm past the entrance of the hole. The inserts should not stick out of the hole. Sand around the edge with sandpaper if material sticks out.

Making the bolt

The bolt of the FGC-9 will be the most complex part to produce and will be at the heart of the firing mechanism.

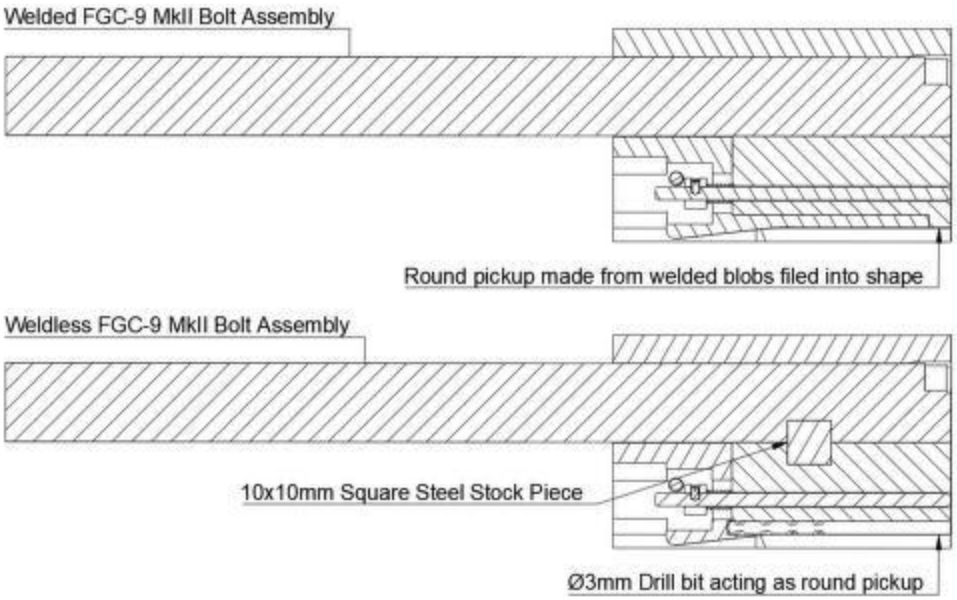
You will have two main ways of attaching the steel stock pieces together that make up the steel portion of the bolt.

Either using a stick welder to attach the two pieces or using JB weld and a piece of square steel stock.

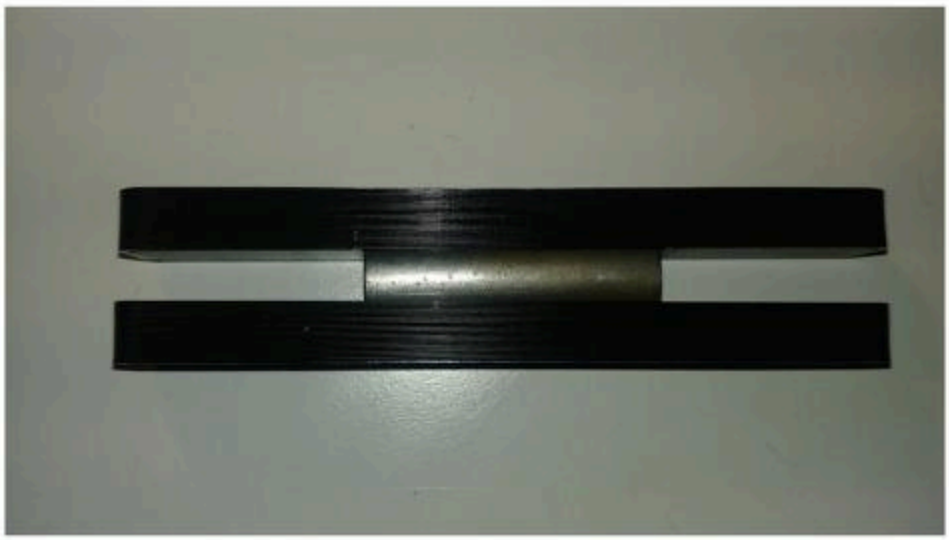
Along with these differences, how the round pickup is added will differ. The rest of the process to build the bolt will be the same. You can choose one or the other depending on your budget and other limitations that have to do with the nature of welding. If you have the tools / environment to go with the option to weld the two steel pieces together and make your bolt that way, it is recommended you do that.

A bolt made with welding will result in a more robust construction that you can have complete confidence in and you will need less manual labor to finish it.

For both paths you will need to begin with drilling the firing pin channel and end with the same recess drilling process. Be sure to read the following pages before starting either process, to get an idea how the options differ.

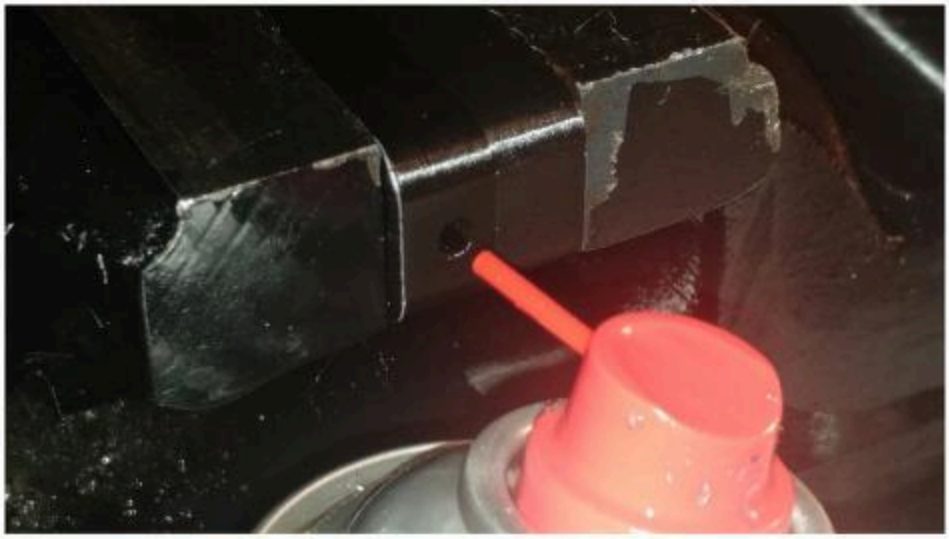

Welded FGC-9 MkII Bolt Assembly
Round pickup made from welded blobs filed into shape
Weldless FGC-9 MkII Bolt Assembly
10x10mm Square Steel Stock Piece
Ø3mm Drill bit acting as round pickup

Drilling the lower bolt rod

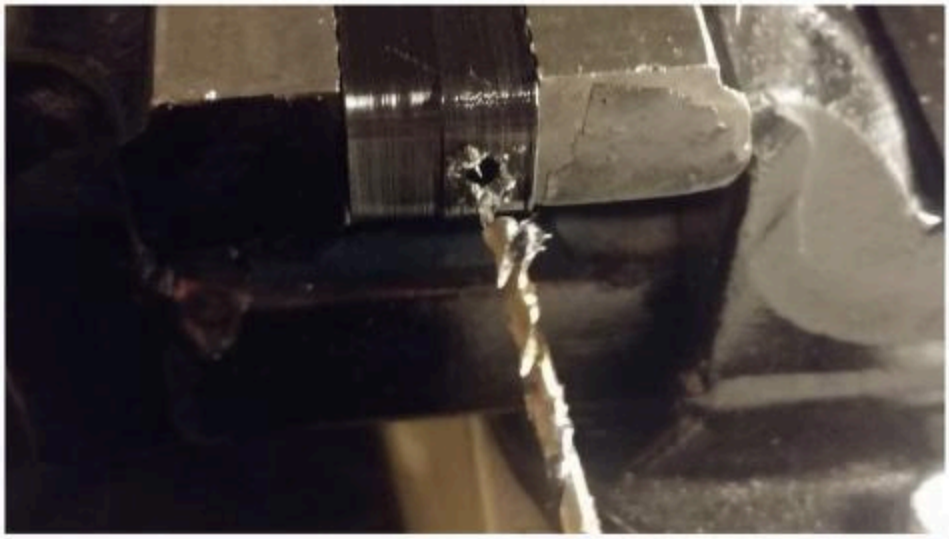


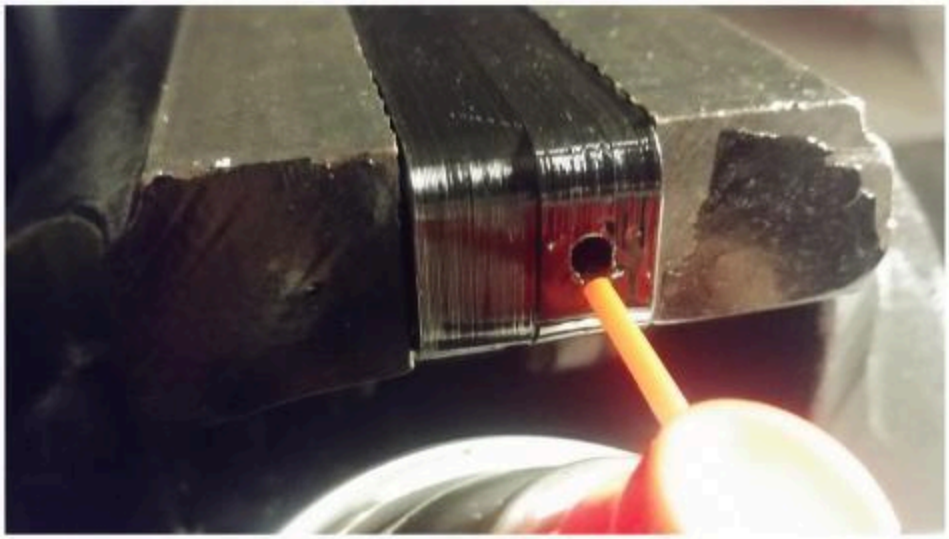
Get your power drill ready with the long 3.5mm diameter drill bit, as well as both drilling jig halves and the 50mm long 18mm bar. Put the short bolt piece (18mm diameter, 50mm long) in between the drilling jig halves.

Put the drilling jig with the bolt piece inside, in between the jaws of your table-mounted vise.



Spray cutting fluid into the hole before starting to drill. With ample of forward pressure start drilling into the setup.





Drill a few millimeters into the hole and then remove the steel chips and add new cutting fluid, then drill again. Repeat this until you can feel that you got through the entire bolt piece.

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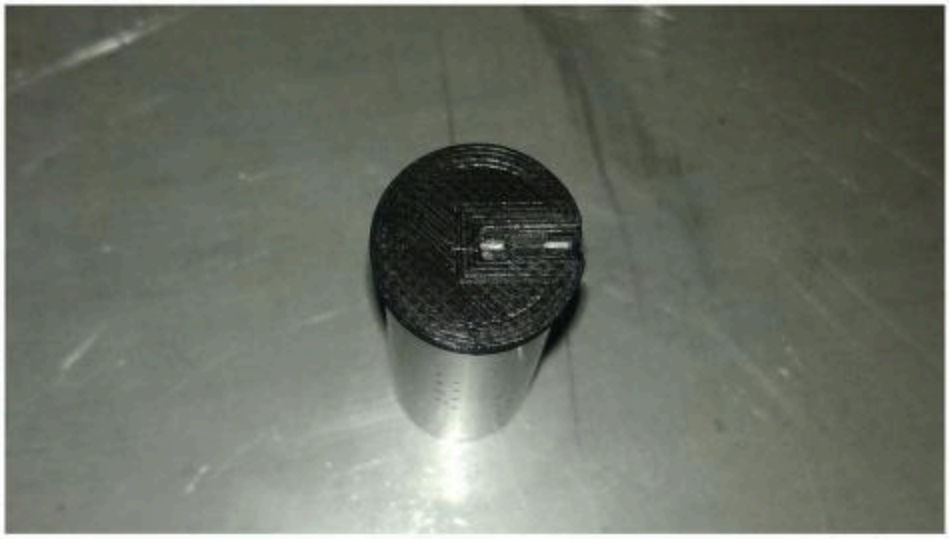
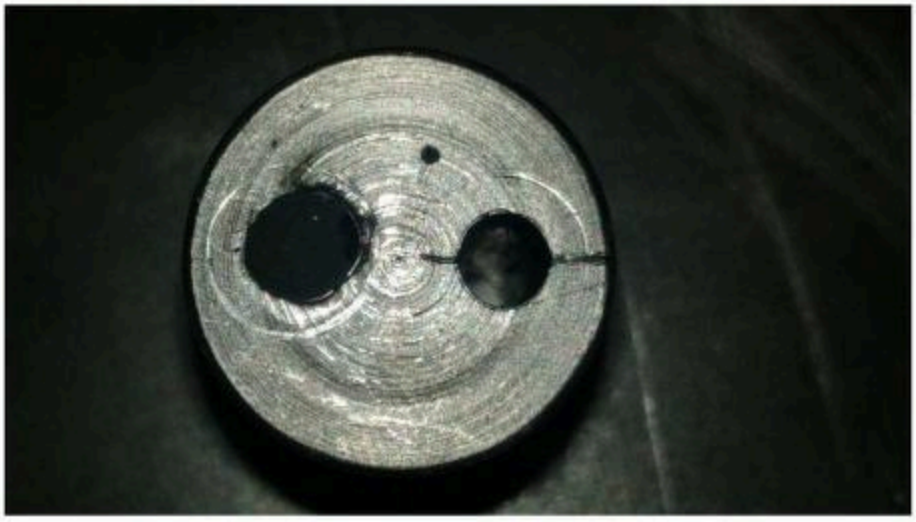
Welded Bolt Option

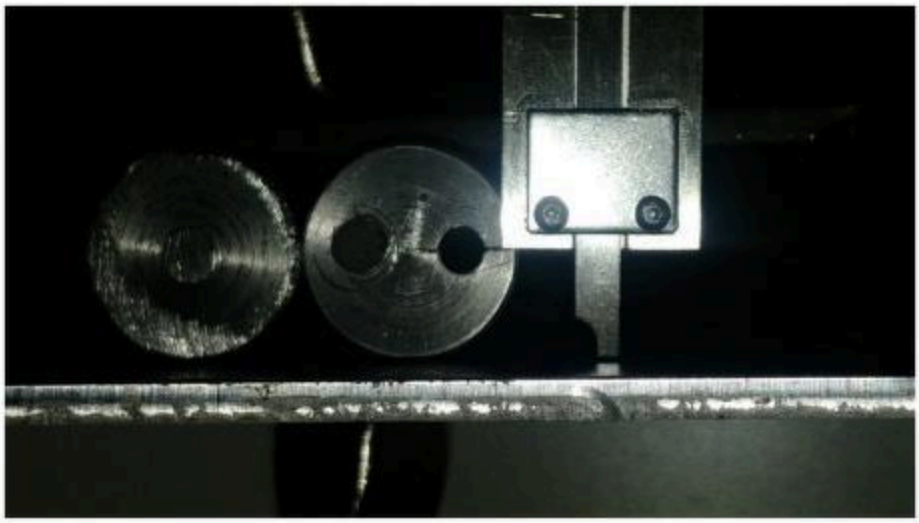
Prepare the tools and materials that you need for the welding process:

- 1x 50mm long, 18mm diameter steel rod piece
- 1x 216mm long,18mm diameter steel rod piece
- Digital Caliper
- Welding table or sheet metal to weld on
- Welding helmet, gloves and welding skirt
- Welding device powered up and connected
- Welding clamp(s)
- Welding Jig



Put the welding jig onto the end of your 50mm bolt piece aligning it via the firing pin channel hole. Use the bottom corner of your digital caliper or a similar metal device to scratch along the slot of the welding jig.



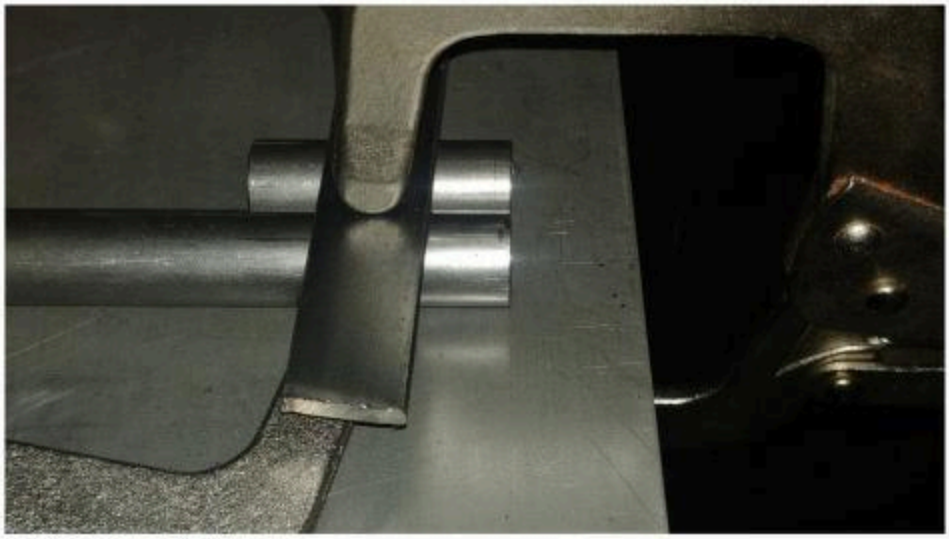


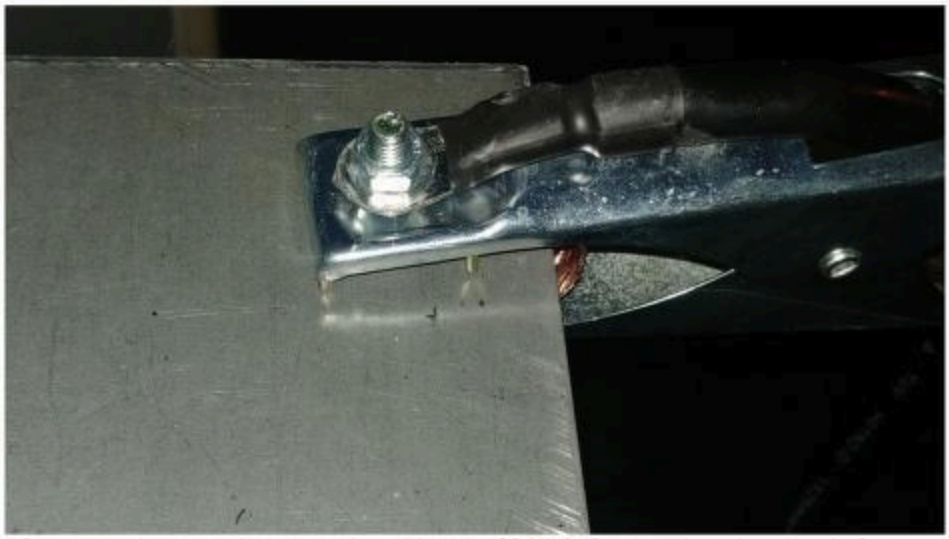
You should now have a clearly visible line on the side of the lower bolt piece that you want to be the bolt face of your bolt.

Now put the 50mm long bolt piece as well as the 216mm long bolt piece and put them next to each other as close and straight as possible.

The firing pin channel should be at the 3 o clock position, while the longer bolt piece should be laid at the 9 o clock side of the shorter bolt piece. Just look at the image to see how it should look like.

Use the depth rod of your digital caliper to align the firing pin hole to be perfectly at the 3 o clock position as you see it in this picture.
You do this by measuring the distance of the line to the bottom of the plate you have the bolt piece on. Since the bolt piece has a diameter of 18mm, you need the distance of the scratched line to the bottom to be exactly 9mm.





After you have made sure that the drilled hole in the shorter bolt piece is exactly halfway between top and bottom (at the 3 o'clock position) use your welding clamp to fix the two bolt piece perfectly into position as you can see it in the upper picture.

Measure the 9mm distance again to confirm that the firing pin hole is still perfectly at the 3 o' clock position. Make absolutely sure that the front faces/ends of the bolt pieces are absolutely flush.(LOOK AT THE UPPER PICTURE). Meaning on the front/bolt face the ends should be in line and one bolt should not stick out more than the other.

You can now go ahead and connect the contact of your welder to the welder table and turn on your welding device.

Turn on your arc welder and then set the appropriate amperage which you can find on the packaging of the electrode you will be using, for example when using some 2.5mm diameter electrodes you will need to set your arc welder between 65 and 80 amps.

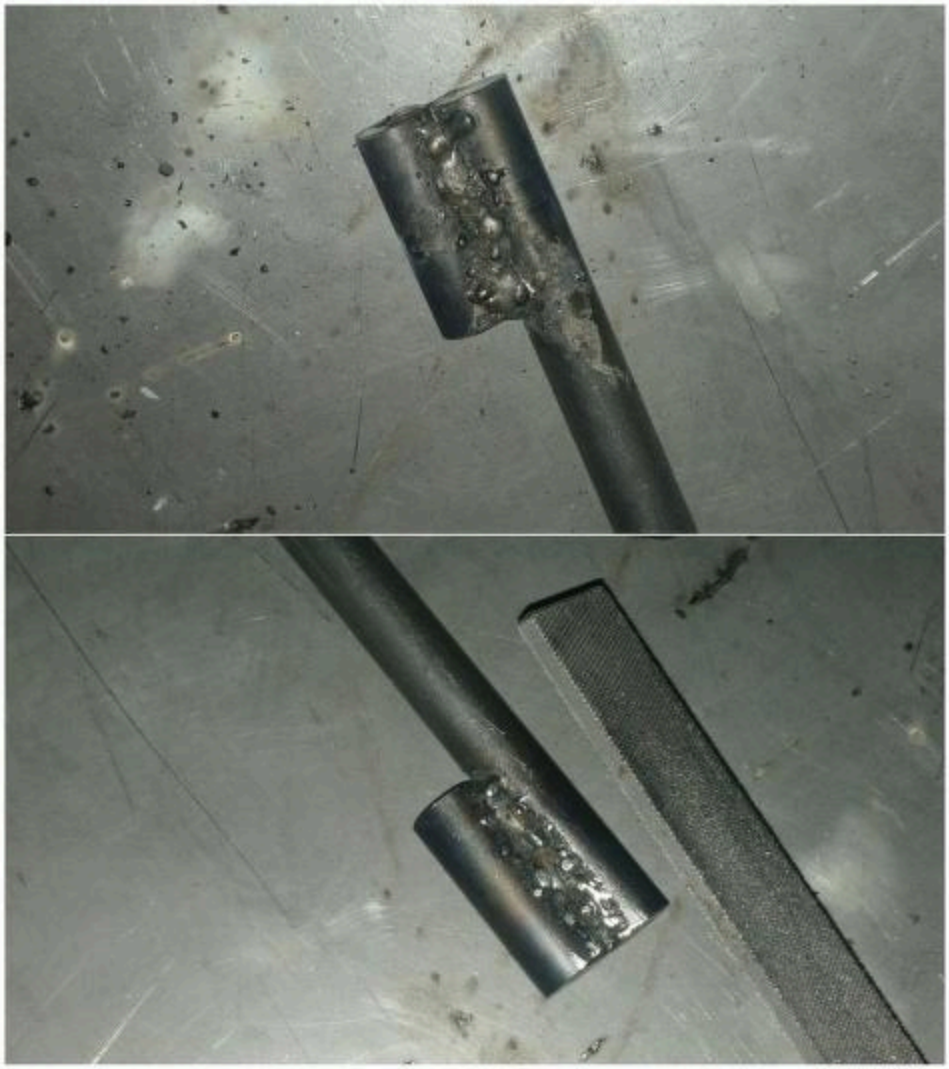
Be sure to wear welding gloves, welding apron and a welding visor before going ahead.

Attach the negative contact from the arc welder to the metal plate on which the bolt pieces are laying.

Hold one of your electrodes with your electrode holder which is plugged into the arc welder device and use some scrap sheet metal strip to try to start a bead, meaning you will have to get the feel to start welding. Imagine how it feels like to strike a match. In a similar fashion you need to strike slowly but fluidly the metal with the tip of the electrode.

After you have successfully got a bead and even a weld line going on a piece of sheet metal, you can go ahead and run the electrode between the two bolt pieces to fill the gap with material.

If you can't manage to get a good bead / seam going try to use other kinds of stick welding electrodes, as they might be better suited for the steel you are working with.

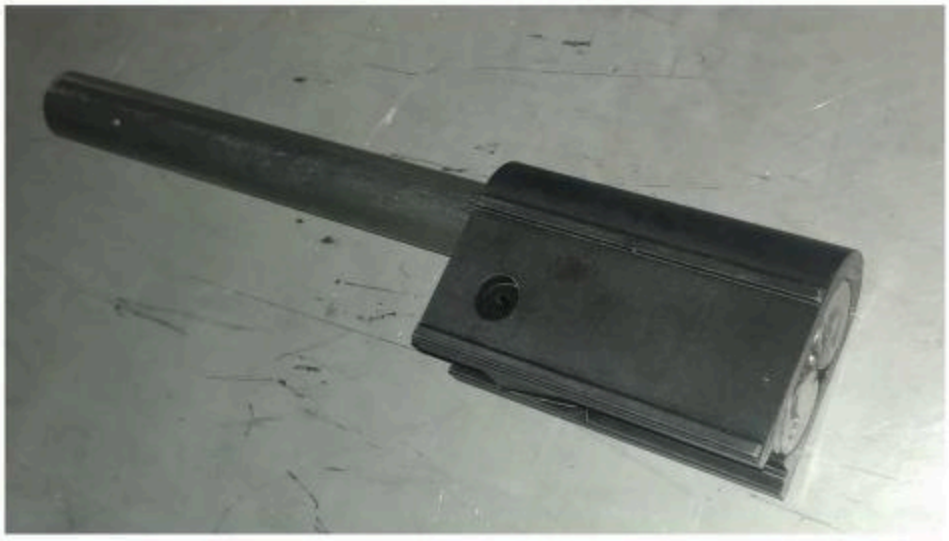


After the first few blobs that you put into the gap, you can remove the clamp and work with the bolt pieces just laying on the metal plate. You will struggle to keep it going consistently but that doesn't matter, keep going at it until the gap on each side looks like in the image.

Once you have filled both gaps on both sides like you see in the picture, use your file to remove as much of the welded material until it can fit into your printed bolt housing.

It will probably take some time until you have filed enough material from the filled gap as well as accidental weld blobs that prevent the bolt from going into the bolt housing.

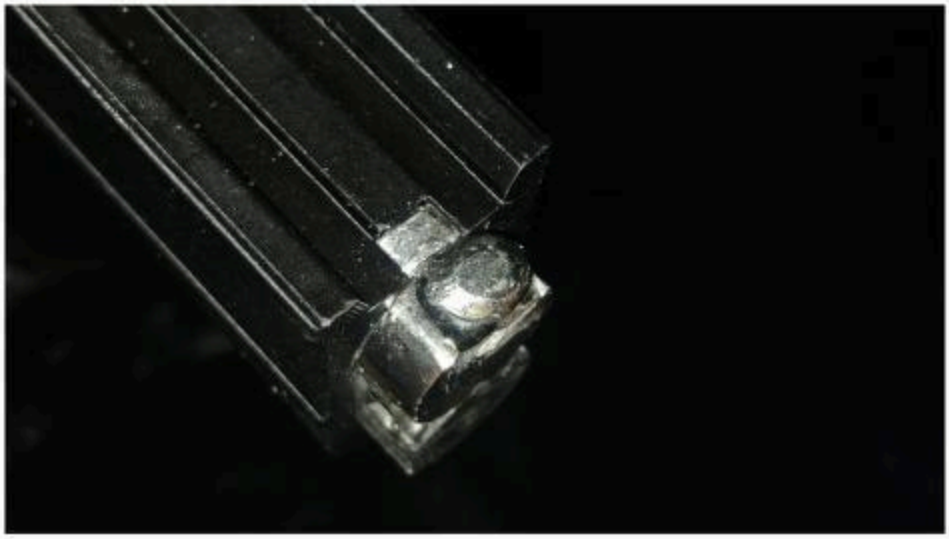
Make extensive use of your metal wire brush and slag hammer to remove as much slag from the welded seam before you spend much of your time using the file.



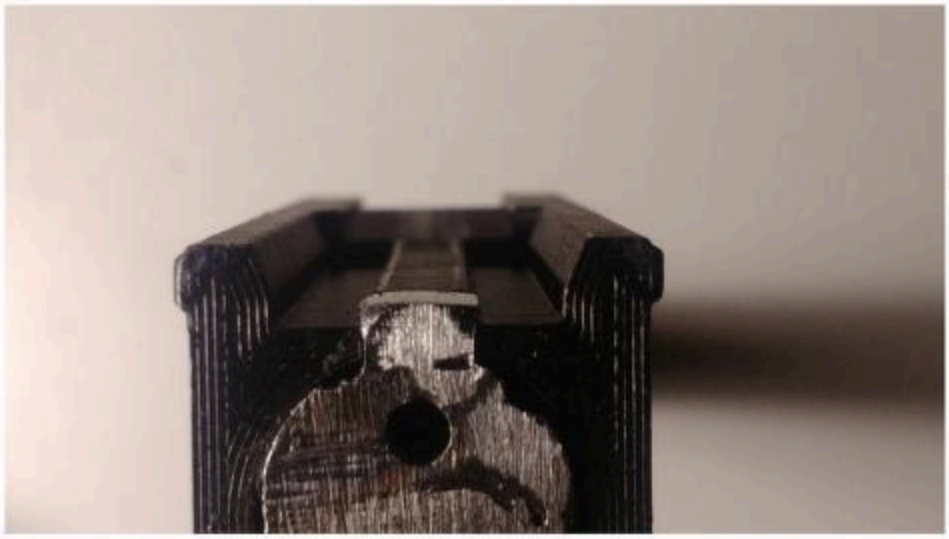
Eventually you should be able to slide the bolt into the bolt housing. Don't try to use too much force getting it in. Try to look meticulously on the bolt for excessive weld material that might prevent the bolt from getting. You also will probably have to remove material from the steel bolt piece themselves, especially on the sides to get it to fit in.

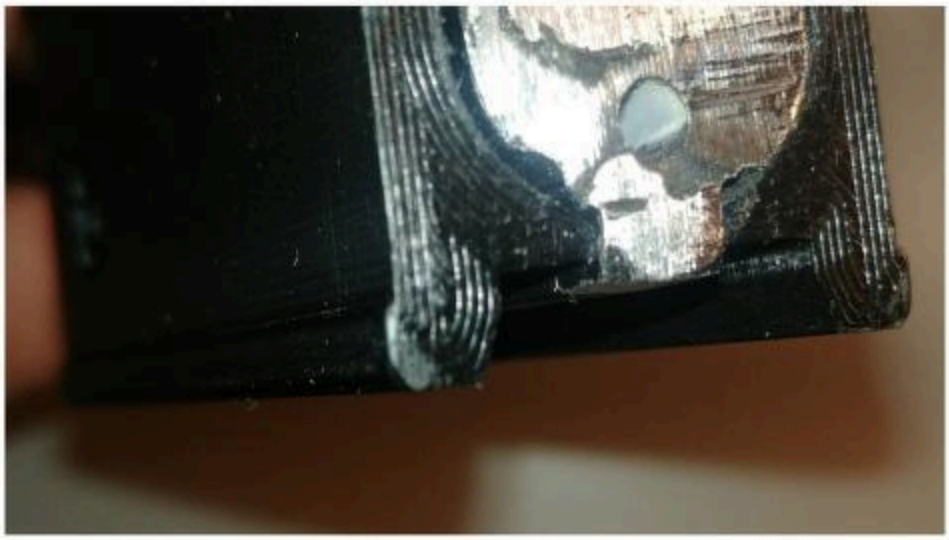
Once the welded bolt fits inside the bolt housing use a sharp metal object, a pen or something similar to scratch the outline of the cutout on the bottom of the bolt carrier onto the bottom of the 50mm bolt piece as you can see it in the image.

Using one of your partially spent welding sticks that is shorter, add blobs of weld material. Add a blob, let it cool off and then add another blob on top of it until the tower of blobs looks similar to the picture.

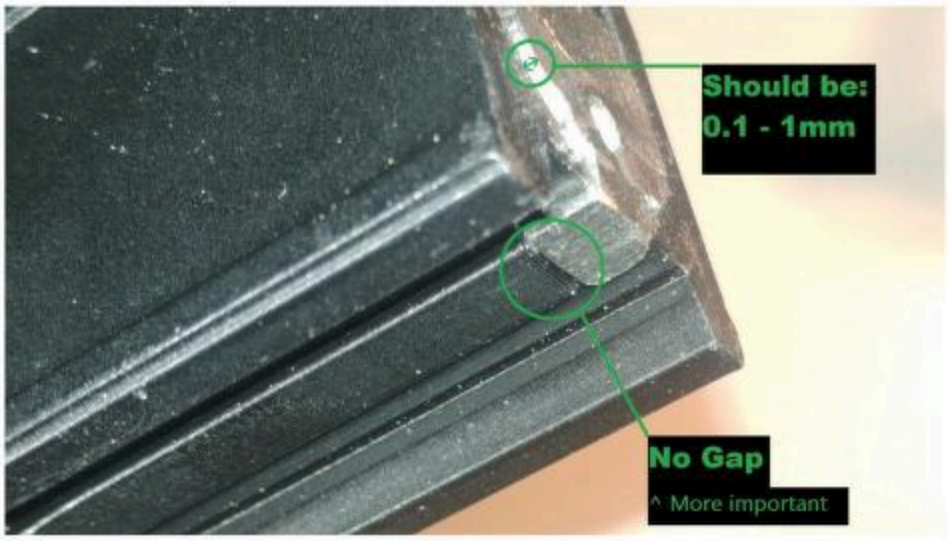


Once your blob tower is high enough and wide enough to cover the cutout you can go ahead and use your metal file to shape it in such a way where it becomes a square that fills out the cutout on the bolt housing.





It doesn’t have to be perfect but the sides of the square you are creating should follow the sides of the bottom geometry on the bolt housing as you can see it, in the picture.



The behind of the square shape will determine how far you can shove the bolt inside the bolt housing. Remove material from the back side of the square shape, so that you can shove the bolt into the bolt housing.

Do not keep removing material from the back side of the square shape, once the bolt face is only sticking 0.1-1mm out, and more importantly when a gap already appears in the circle shown in the bottom of the picture. If the gap has appeared but the front face of the bolt is still sticking out more than 1mm, use sand paper to evenly reduce the protrusion of the steel face.

Once you have managed to file the square into shape so it roughly fills out the cutout on the bottom of the bolt housing and the bolt in fits inside the bolt housing well while not sticking out too much, you then can go ahead.

Prepare the steel bolt, the bolt housing, JB weld and the tools to apply it and clean the excessive JB weld off.

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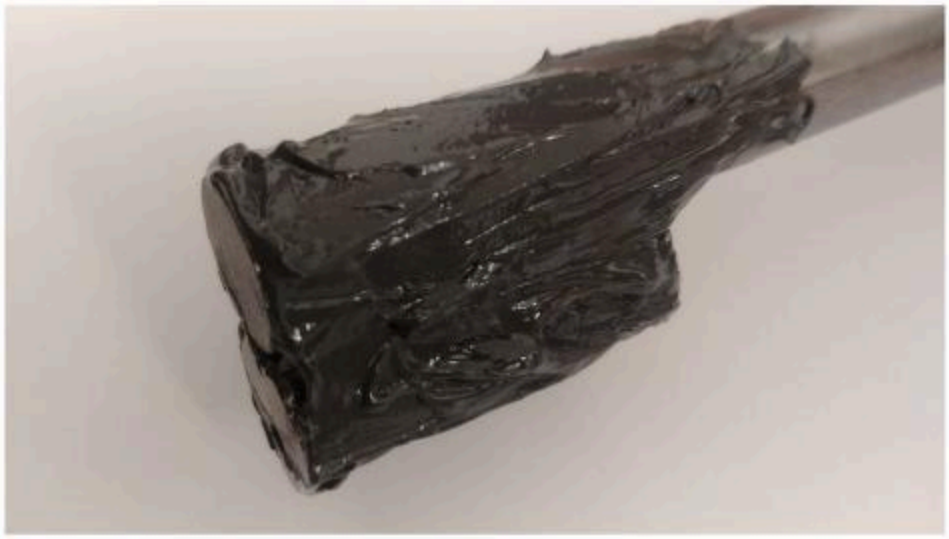
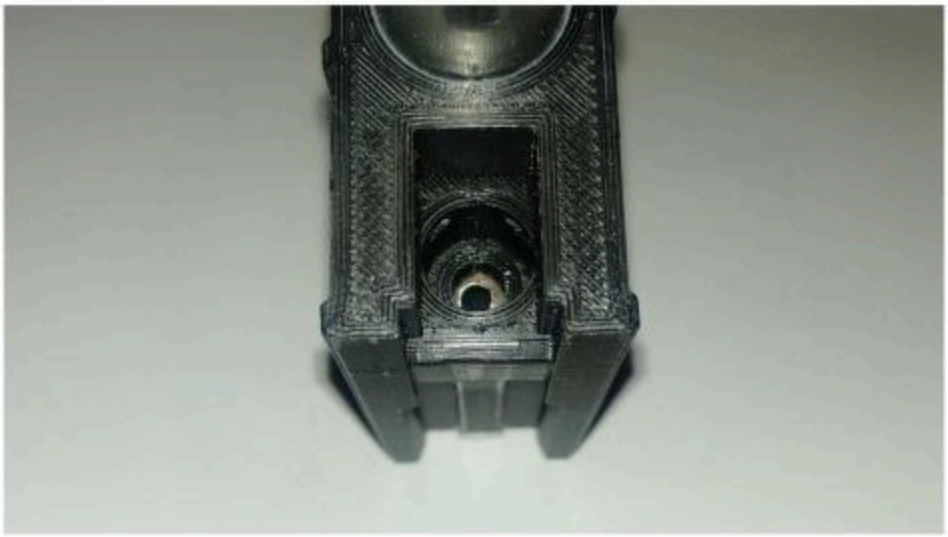


Mix the JB weld very well and then apply it to the steel bolt to the extent that you see on the picture.



Push the steel bolt into the bolt housing with the JB weld applied on it.

Make absolutely sure that you don’t have any JB weld on the backside of the lower bolt rod. It has to stay clean!

Be sure to clean the bolt assembly up to the extent you see in the pictures, before letting it dry.

Let the bolt dry for 24 hours before going ahead with the next steps.

Weldless Bolt Option

Text and pictures by IvanTheTroll

Step 1: Prep Work

Remove all supports from your printed parts. Your Bolt Cutting Jigs should have four upright posts that act as integrated supports – use a screwdriver or pliers to remove these four posts, as you don't need them in place. You don't need to be very precise, just get the posts out of the way. It's fine if a little of the post stays stuck to the jig itself.

Jigs before removing posts

Jigs with posts removed.

You will also need to take your 10x10mm bar stock and cut a ~17.75mm long section from it. Use a hacksaw, your grinding tool, or whatever other tool you used to cut your bolt rods to length. The length of bar stock is beneath the bolt rods in the following picture:

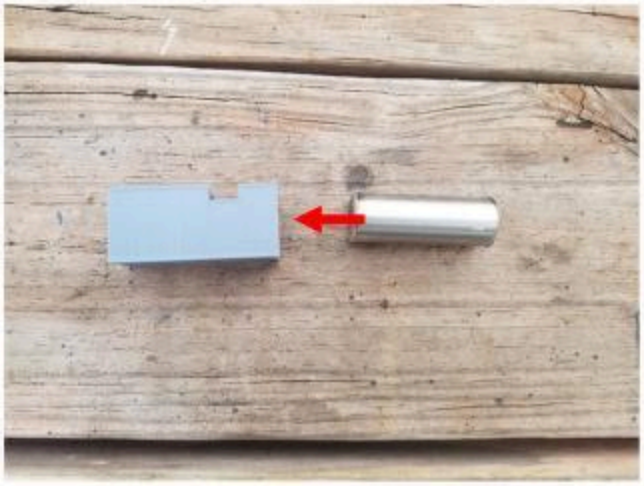
Bolt rods cut to length with bar stock cut to length.

Step 2: Creating Weldless Lower Bolt Rod

For the next step, you will need to make sure you have your bolt rods cut to length (refer to the FGC-9 documentation for this exact length) and your firing pin channel drilled (again, refer to the FGC-9 documentation for the jig and tutorial on how to drill the firing pin channel). I will stress that it is *very* important to get your firing pin channel drilled as straight as you can – It's also a good idea to mark which end of the lower bolt rod you drilled into, as this end of the lower bolt rod should become your breech face. Use a punch or screwdriver to make a small mark on this end of the bolt rod.

Note: I recommend you do these next couple steps outdoors if you are using a power tool to grind. If this is not an option, try and use a room that has tile floor and is easy to sweep in – this process makes a big mess since you are grinding away a lot of metal.

Take your lower bolt rod, one of your cutting jigs, and the same drill bit you used to drill your firing pin channel. Insert the lower bolt rod into the jig *BREECH FACE FIRST* with the firing pin channel lined up with the larger of the two holes in the front of the cutting jig. It is important that you insert the breech face first to ensure things line up. The breech face is whichever side of the lower bolt rod that you drilled into first when drilling your firing pin channel, or whichever end of the rod lines up the best. If your firing pin channel is too far misaligned and you can't get the firing pin channel to line up with the hole in the jig, make a new lower bolt rod and be more careful when making your firing pin channel.



Insert the lower bolt rod into the jig fully – make sure it is inserted as far as it can go.

Assuming you inserted the lower bolt rod with the firing pin channel aligned, take your drill bit and insert it from the front of the jig. It may be a snug fit, but if you can get it to go in (you can tap it in gently with a hammer if needed) then your firing pin channel is close enough to work correctly.

Insert the drill bit you used into the larger of the two holes – the one that lines up with the firing pin channel.

Double check that the bolt rod is still pushed as far into the jig as it can possibly go – this is very important. After checking this, take your vise grips/clamp/vise and clamp down on the end of the jig – this will lock the bolt rod in place. Make sure this is quite tight – don't worry about deforming the jig, you want to keep the bolt rod totally still. MAKE SURE THAT YOUR DRILL BIT IS STUCK IN FROM THE FRONT OF THE BOLT – you can't see mine in the picture, but you must make sure it is inserted.

Clamp down tight!

Next, you are ready to start removing material. This will get a little messy, and if you are using power tools you should use safety glasses. Safety squinting and looking away won't work here, as you have to closely inspect how much material you have removed. Get your grinding tool ready and find a comfortable way to control both the clamped bolt rod and the grinding tool – I used one hand on the grinder and one hand on the vise grips, but since your set up may vary, take the time to find a way that you can keep the clamped bolt rod and grinding tool under control.

Now you are ready to remove some metal – you will need to use your grinding tool to make a notch in the bolt rod that follows the shape of the cutout in the jig – about 10mm wide, about 5mm deep. Take frequent stops to check how much metal you have removed, but try to work quickly – removing this much metal makes lots of heat, and your jig will start to melt. I've made four of these bolts at time of writing this, and using the grinder pictured I am able to remove the material before the jig gets totally melted. If you are using a Dremel tool, you can take breaks to let everything cool – if you don't ever get the metal red-hot from heat, you can use water to cool it. But if you do get the metal red-hot, DO NOT use water to cool it off – this can cause weird local heat treating to occur, which could lead to a weak bolt.

Be sure to control your tools! Don't lose control of them and grind something you aren't supposed to.

Once you have removed at least 90% of the metal from the slot, you can remove the jig from the bolt rod. If it is getting melty, wear gloves and use a screwdriver to try and pry the jig off. You can also use a punch to drive the bolt rod out of the jig using the small hole in the front of the jig. Because this jig has been overheated, it isn't reusable, so don't be afraid to break it.

Take your 10mm bar stock and test how it fits into the slot. Usually it won't quite fit right away – you can use a Dremel tool or metal file to remove just a little more metal and get the bar to fit. I don't recommend using a grinder, because removing too much metal can ruin your bolt rod. You will want the bar to fit close to snug in the slot, with about half of the bar stock sticking up out of the slot.

Test fit the bar into the slot in the bolt rod.

Use a metal file to square up and fine-tune the slot in the bolt rods. File a little, test fit the bar, file some more, etc.

Step 3: Creating Weldless Upper Bolt Rod

Without going into too much detail, you will make the upper bolt rod just like you did with the lower bolt rod – only you won't need to use a drill bit to align the firing pin hole, since there isn't a firing pin hole on the upper bolt rod.

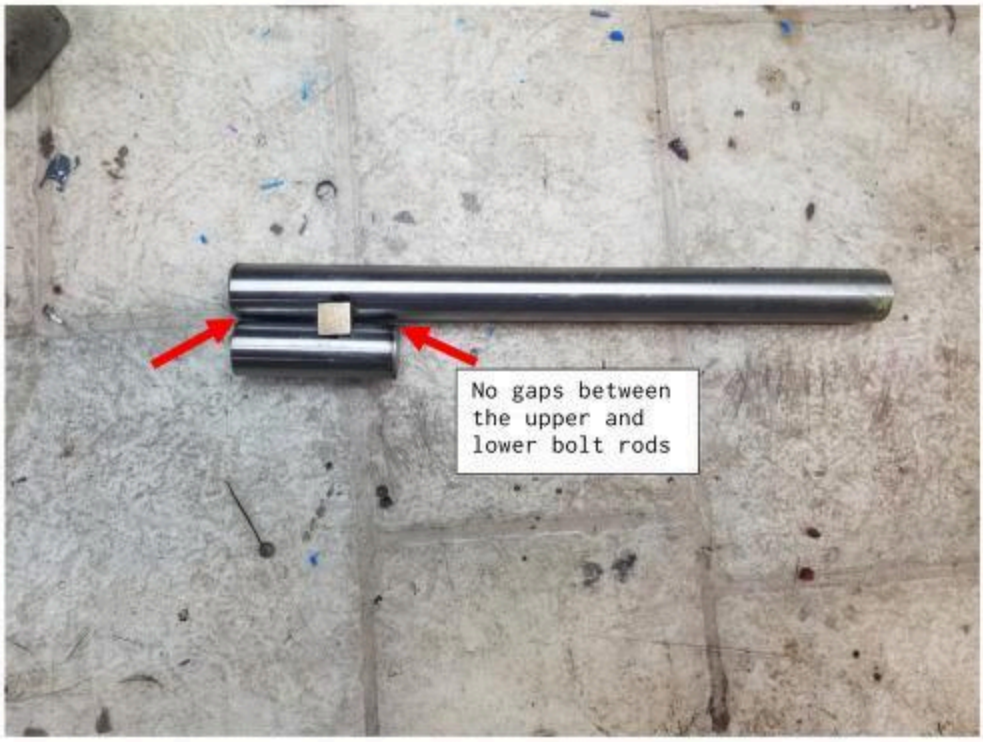
Take your rod, insert it fully into your second cutting jig, clamp it in place, then use your grinding tools to cut the slot into the rod. Follow the same steps as in Step 2 with regards to cleaning up the slot after you have removed most of the metal.

As a reminder, a snug fit on the bar stock is ideal (the less it can wiggle towards either end of the rod the better), and half of the height of the bar stock should be sticking out of the slot when the bar is placed into the slot.

Correct fitment of the bar stock into the slot

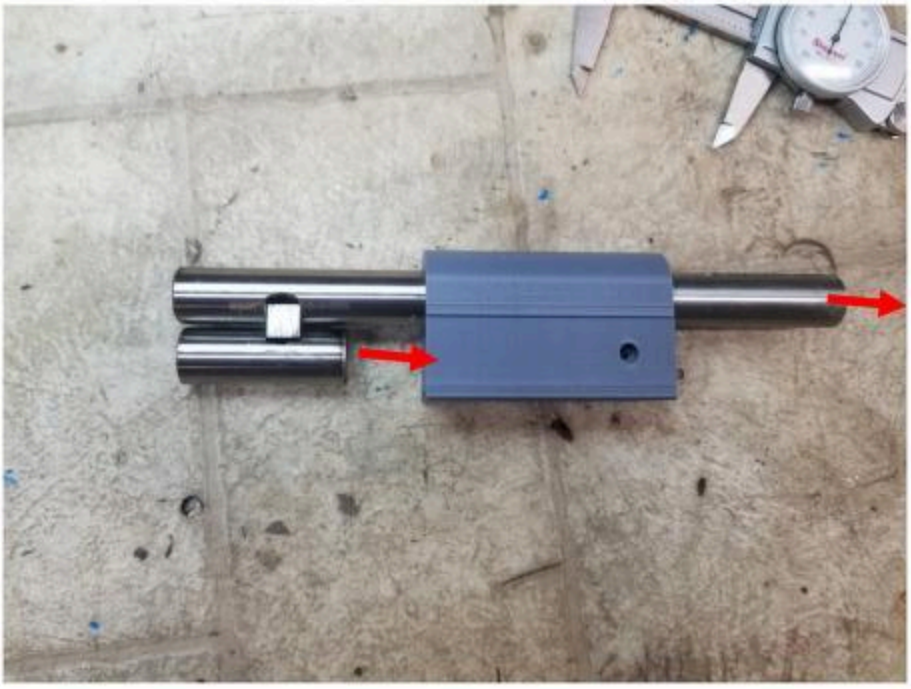
Step 4: Assembling the Bolt

Once you have slotted both bolt rods, take your bar stock and both rods and lay them out like seen in the picture below. Your bar stock might not sit perfectly flat/straight, but so long as the top of the upper bolt rod touches the bottom of the upper bolt rod, then you've cut your slots properly. If the bolt rods have a gap between each other because the bar stock doesn't fit deep enough into the slots, you will need to make the slots a little deeper.



Layout of the weldless bolt. Make sure there is NO gap between the bolt rods. If there is, you need to make the slots deeper.

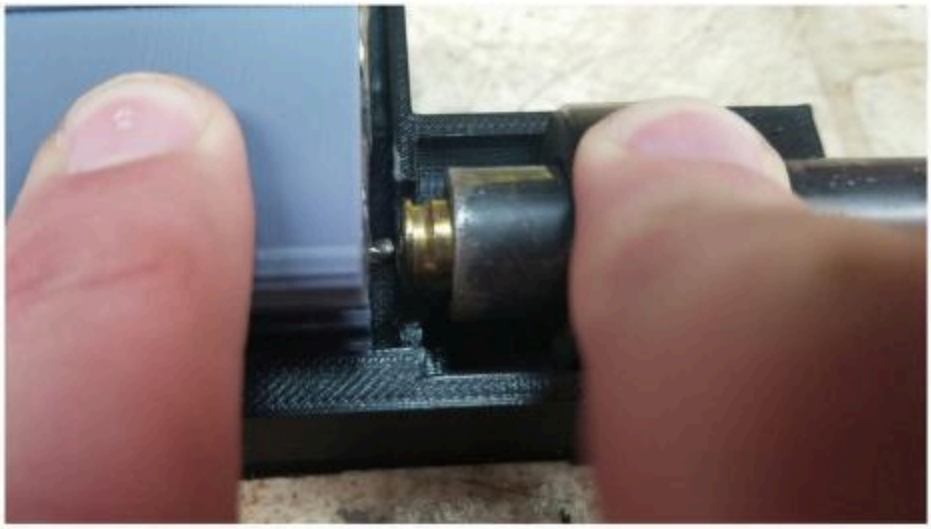
After ensuring that the bar stock can fit between the bolt rods without any gap between the two bolt rods, you are ready to do a mock-up fit of your bolt assembly. Take your metal parts and your bolt housing. Insert the metal parts into the bolt housing as shown in the picture below. Make sure that your bar stock is centered when it passes into the bolt housing. If you didn't make sure that there was zero gap between the top and bottom bolt rods, you won't be able to get the metal parts to fit inside the housing – go back to the previous step and fix this. It may be a little hard to get your metal parts inserted the first time – the bolt housing is intentionally tight to help align the metal parts.



Carefully guide the metal parts into the bolt housing. You might need to tap them in gently with a hammer the first time.

After fully inserting your bolt rods, I recommend you take the drill bit you used to drill the firing pin channel, your FGC-9 headspacing jig (make sure you've read the FGC-9 documentation to understand this tool), and your FGC-9 barrel, as well as a spent/fired cartridge (you can use a live cartridge but be careful). With the cartridge in the chamber and the drill bit sticking out of the firing pin channel, use the headspacing jig to check how the firing pin channel and cartridge/primer align. If the drill bit in the firing pin channel points right at the middle of the primer, you've done well. If it doesn't line up, you will probably have to make a new lower bolt rod - pay close attention when drilling your firing pin channel.

Checking firing pin alignment

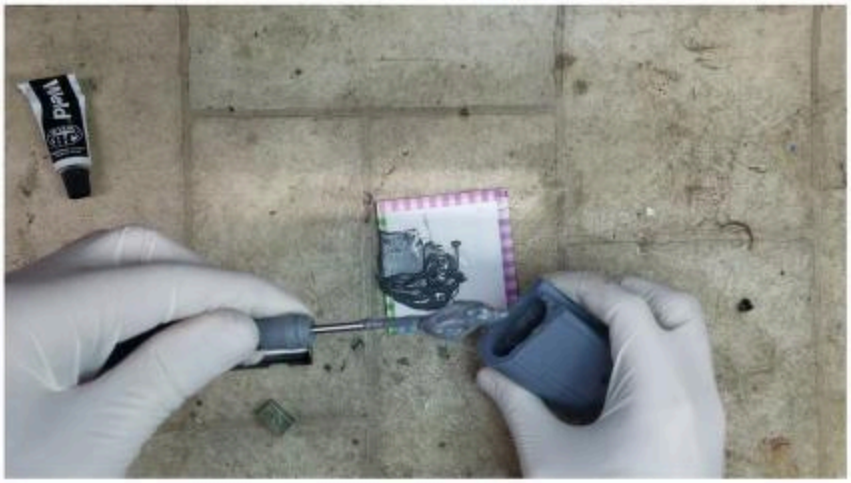


Get up close and check – this firing pin channel is well-placed.

After checking alignment of the firing pin channel, you are ready to JBWeld your bolt assembly into the housing. This step will be messy – don't wear any nice clothes, do not work near carpet, and you may want to wear gloves. Start by mixing a large amount of JBWeld – about 1/3 of each tube should be used for this step. When using large amounts of JBWeld like this, you will need to mix the two parts for about 5 minutes to ensure it is fully mixed.

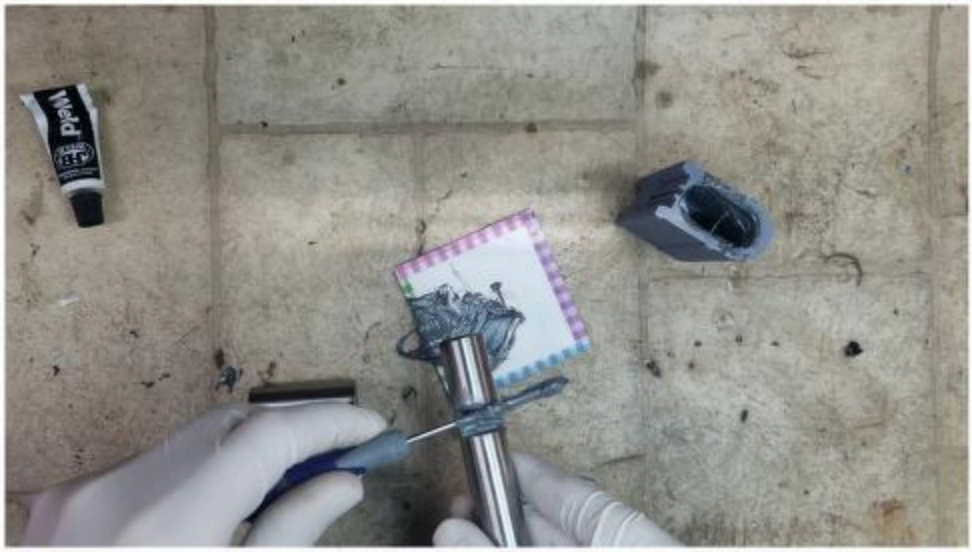
The minimum amount of JBWeld you should use. Mixing more than this amount is a good idea.

After mixing, use a cheap screwdriver, popsicle stick, or other tool to smear JBWeld on the inside of the bolt housing. Apply lots of JBWeld, but try to leave an even coat – you don't want big blobs, you want it spread out on the inside of the housing.



Apply JBWeld to the inside of the housing. Use your tool to spread it out.

Next, I recommend you use brake cleaner/degreaser to clean all the metal parts – this isn't required but will help make a stronger bolt. After cleaning the metal parts, fill the slots in the upper and lower bolt rods with JBWeld. Make a big blob, and ensure the slots have as much JBWeld in them as you can fit.



Fill the slots.

Place the bar stock into the lower bolt rod - JBWeld will squish out. Try not to wipe this up - you want to leave it squished out. Squish the lower bolt rod and bar stock into the upper bolt rod - more JBWeld will squish out.

Squish the rods together.

Now, insert the bolt rods into the housing. As JBWeld squishes out, try and guide it into the crevasse between the bolt rods and the housing. You want to cram as much JBWeld between these parts as you can

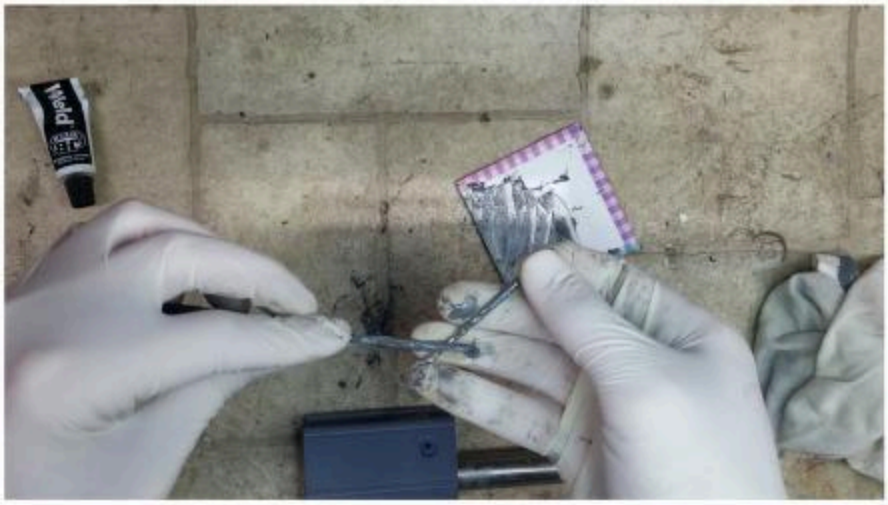
Smush the bolt rods down into the housing. Smear any JBWeld that squishes out onto the bolt rods and back into the housing.

Push/pull the metal parts until they are fully seated into the bolt housing. Shove any JBWeld that squishes out back into the gaps between the bolt rods and the housing.

Pulling the bolt rods until they are fully seated.

Smearing excess JBWeld back into the gaps.

Take your extra 3mm drill bit and coat it in JBWeld – build up lots of JBWeld on the drill bit, fill the flutes with JBWeld. After coating the drill bit, you will insert it into the slot at the bottom of the bolt housing. Insert it until it stops – some of the drill bit will still be sticking out, this is fine for now.

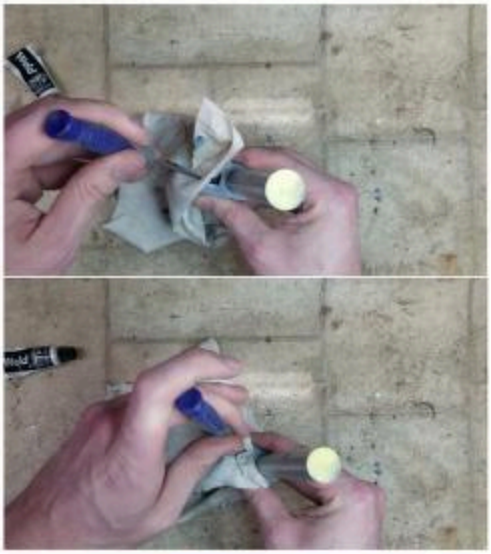


Apply lots of JBWeld!

Smooth out the JBWeld along the bottom of the drill bit/bolt with your finger. Make sure plenty of JBWeld is smeared over the bottom of the drill bit/bolt, as seen in the following picture.

At this point, most of the messy work is over. Use a rag to wipe up any JBWeld on the exposed section of the upper bolt rod. Clean up any JBWeld that you got on the sides of the bolt housing. Finally, you will need to clean out any JBWeld that you got into the firing pin channel/firing pin housing. I usually just use a rag and a screwdriver for this. Use the screwdriver to guide the rag into the rear of the bolt and mop up all the JBWeld that you see. Try and get as much of it out as you can.

This JBWeld needs to be cleaned out.



Mop up all that JBWeld!

You're finally done making messes - set your bolt upright for at least 24 hours to let the JBWeld set up. I recommend you use a clamp on the outside of the bolt housing while the JBWeld sets up (the clamp doesn't need to be very tight, just holding everything steady).

Bolt assembly clamped in place while the JBWeld cures.

After the JBWeld has cured for 24 hours, use a hacksaw or Dremel tool and a file to cut the 3mm drill bit off – you will need to make sure you cut it off perfectly flat with the face of the lower bolt rod. I recommend you cut 90% of the length of the drill bit off with your hacksaw or Dremel tool, then use your metal file to file down the firing pin until it is flush with the face of the bolt. You may also have to take the drill bit you drilled out your firing pin channel with and drill any JBWeld out of the firing pin channel itself.

Dremel off most of the drill bit, then use a file to make it flush with the bolt face.

Drill bit filed flat with the bolt face.

Side view – note that the face of the bolt is flat and the drill bit does not protrude.

With this step complete, your bolt is done. If you are making an FGC-9 MKII, you will need to drill the recess for the charging handle into the upper bolt rod – refer to the main FGC-9 MKII documentation for the process on doing this.

Weldless Bolt FAQ/Troubleshooting

Q: What sort of round counts should I expect? What ends up breaking?

A: While this bolt is by no means stronger than a proper welded bolt, I have put 500 rounds through one and experienced no issues. If I had to guess, either the drill bit will come loose and the bolt will lose it's ability to pick up rounds out of the magazine, or the JBWeld holding the bar stock in place will crack and the bolt rods will become wobbly. If this happens, STOP USING THE BOLT- I'm sure the gun won't feed right if this happened, so if you have a weird malfunction and the bolt feels wiggly, consider the gun out of commission.

Q: What sort of reliability should I expect?

A: Reliability has been great with the bolts I've made - on par with the welded bolts. It's pretty amazing how well the setup itself works, I did not expect it to work as well as it has.

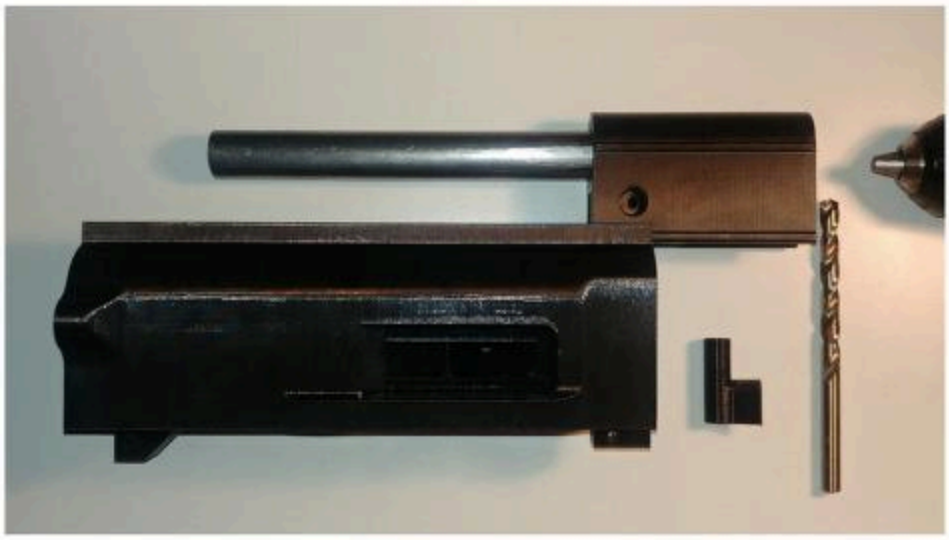
Q: Why am I getting light primer strikes or failures to extract?

A: Refer to the main FGC-9 MKII documentation/troubleshooting tips for issues like this. It is very important that you headspace weldless bolts per the instructions in the documentation because of the possibility of the two bolt rods not being perfectly aligned when making a weldless bolt.

Q: Can I just use a 3mm rod instead of the 3mm drill bit when JBWelding it into the bottom of the bolt?

A: Maybe, but it will not be as strong as using a drill bit. You can get a set of 10 3mm drill bits for around $5 most places - cheap Chinese ones are fine for this application.

Drilling the charging handle recess



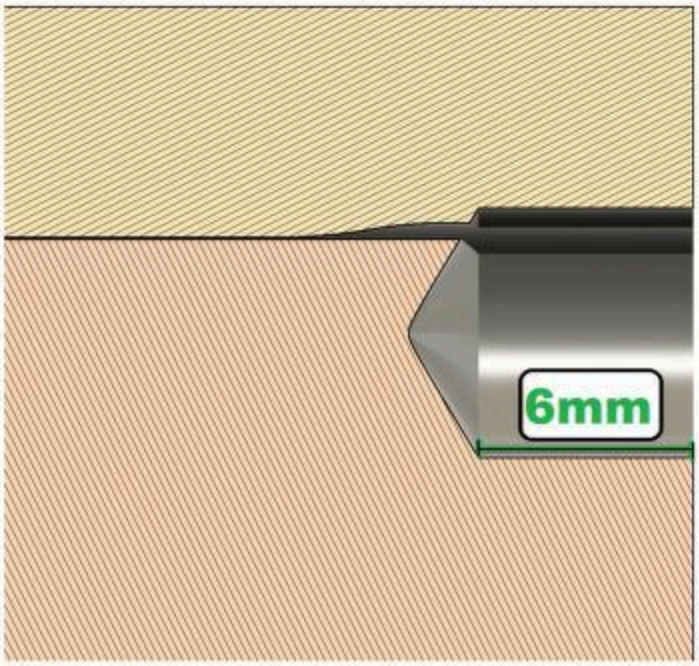
Prepare your power drill, upper receiver, bolt, drill recess jig and a 7mm diameter drill bit. Insert the bolt into the upper receiver. Insert the drill recess jig into the front of the upper receiver. Making sure the bolt does not fall out, clamp the long bolt steel piece between the jaws of your vise. Have as much as you can of the bolt clamped in the vise while still having the bolt be at the end on the inside of the upper receiver.

Apply cutting fluid spray and then use your 7mm diameter drill bit to drill into the opening in the recess jig. Push the power drill forward with force trying to drill as straight as possible at the same time.

Only drill a millimeter or two to at the beginning to get an idea how fast you are removing material while drilling. Be sure to constantly remove steel shavings possible with an air spray can or simply use your cutting fluid spray and a brush of some sort.

Your goal is to drill into the bolt face so that you end up with a recess that is 6mm +-1 deep at the EDGE of the bottom of the recess.

Measure this by using the depth rod of your caliper and have the bottom of that rod butt up against the bottom at the edge of the recess. When you measure at the center of the recess you might measure around 8mm, the reason is that drill bits have a 118° degree tip usually, hence the difference in dimensions center vs edge.



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To help the charging handle go into the recess during operation, use sand paper to deburr/ add a radius to the edge of the recess entrance.

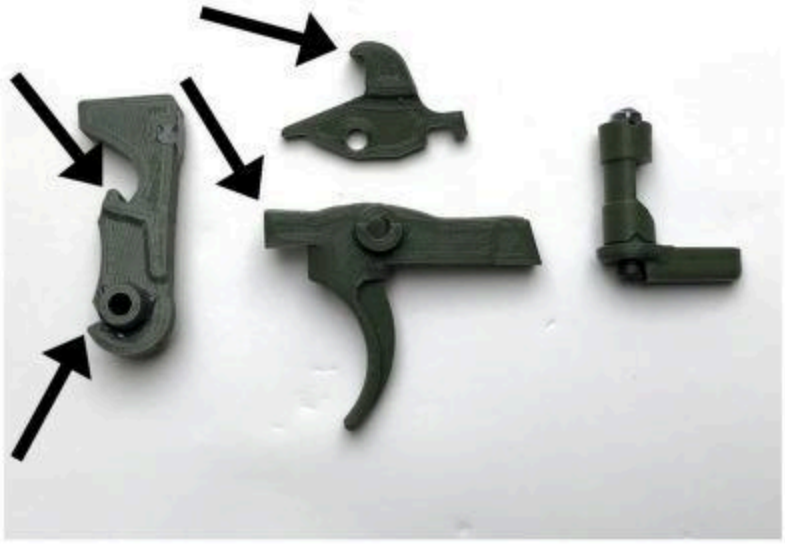
Preparing the Fire control group

BEWARE:

YOU NEED TO MAKE SURE THAT THE PARTS
FOR THE 3D-PRINTED FIRE CONTROL GROUP ARE
PRINTED PROPERLY ON A CORRECTLY ASSEMBLED PRINTER.

FOLLOW THE ASSEMBLY INSTRUCTIONS CAREFULLY!

AN IMPROPERLY PRINTED OR INCORRECTLY INSTALLED
FIRE CONTROL GROUP CAN LEAD TO
UNSAFE FUNCTION OF THE FIREARM
INCLUDING ACCIDENTAL FIRING OF THE FIREARM.



When taking these 3D-printed fire control group parts off the print bed, be very careful.

Do not damage the sear surfaces. Refer to the photo if you are not sure where the sear surfaces are.

Take your time removing the support material.
These are delicate precision parts, treat them as such.

Refer to the included support removal videos.

Use a 4mm drill bit to drill out the holes of the trigger, hammer and the disconnector. It is important to drill straight. Drill as little as possible.

Drill carefully, stop and test whether the pin can pass though the holes without excessive resistance before drilling again.

You do not want the pins to be too loose.

This is especially true for the trigger and disconnector, as the AR-15 trigger pin that will go through these two components will be slightly smaller in diameter than the DIN pin for the hammer.

Clear out the support material from the internal channel of the trigger, take extra care to remove the brim.

The disconnector must be able to move freely inside the trigger channel without getting stuck, this is very important, use sandpaper if needed.

Again, do not damage the sear surfaces while you clean up the parts.

If your disconnector spring does not fit into its designated recess inside the channel of the trigger because it is wider on the bottom, use your 4mm drill and carefully remove some material from the sides of the trigger channel.

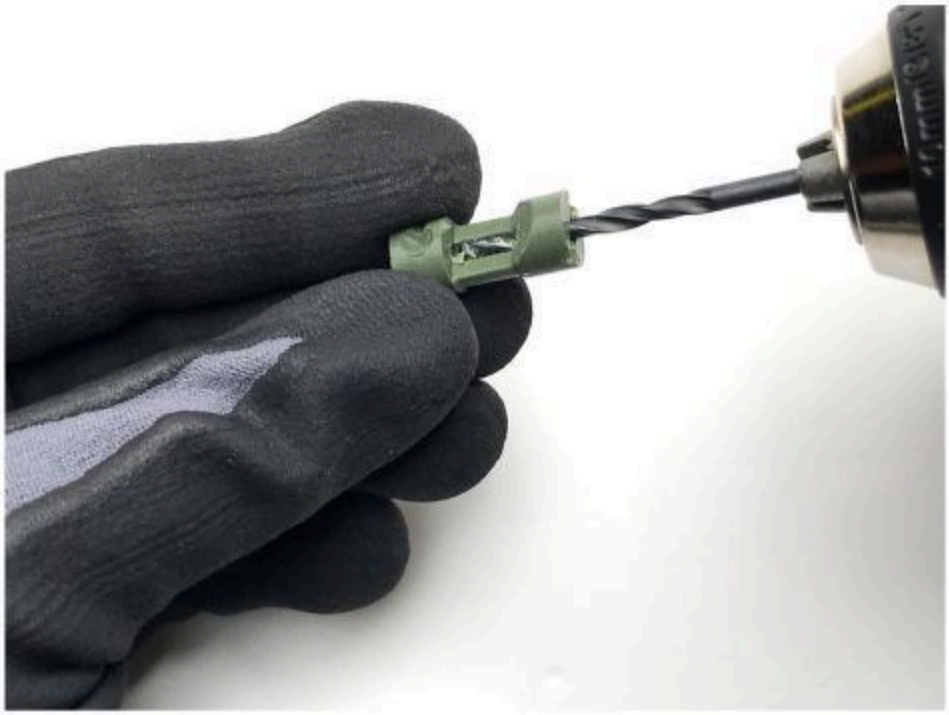
Before going ahead take the DIN 84 screw and screw it partially into the cavity on the face of the hammer, once you made sure it does screw in, screw it out.

Mix up some JB Weld and use something like a nail or toothpick to apply it into the hole. Add some JB weld to the threads of the screw and screw it into the hammer. It does not have to be completely flush with the face of the hammer.

Don't screw it in deeper than the face of the hammer.

Add a good amount of JB weld to the top of the screw.

After 12 hours of letting the JB weld dry, take sand paper or a finer file and sand/file the excess dried JB weld off the top of the screw so that the front surface of the hammer is flat again.



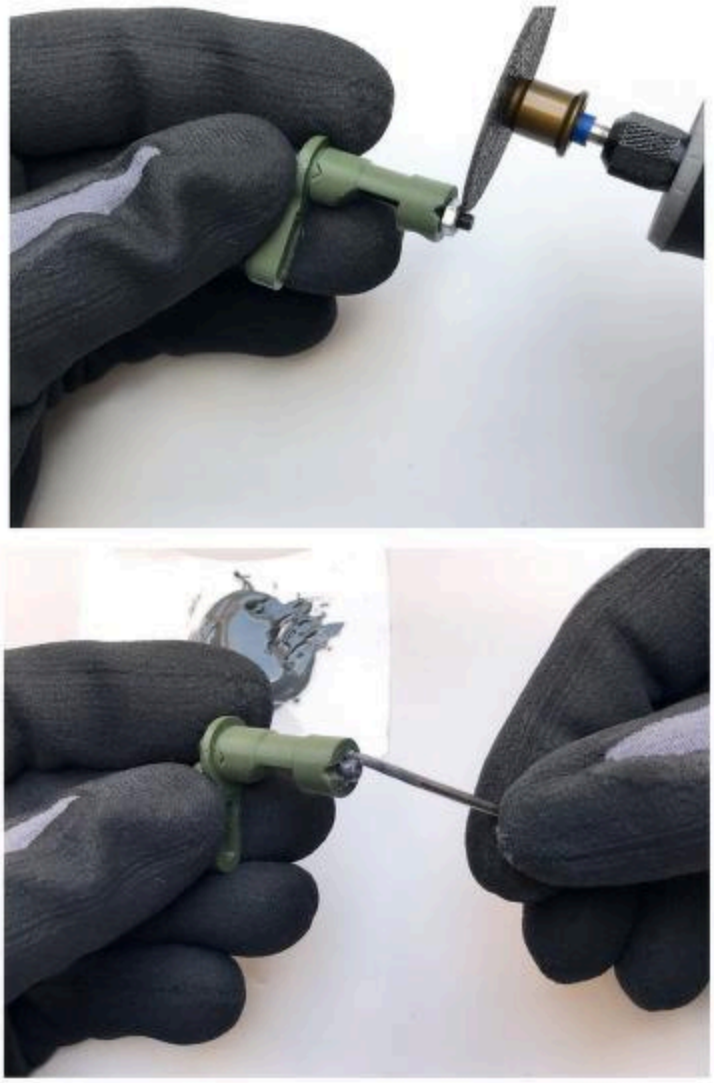
Take your safety selector drum and the safety selector lever and drill out the holes on these parts with an 3mm diameter drill bit.

Ensure that you remove any print debris or brim from the drum, so that the locking / alignment tabs on the levers can fit inside the slots on the drum.

Attach the lever to the drum. The correct orientation is important, refer to the photos.

Insert the M3 30mm long socket head bolt through the safety lever and drum.

Use a M3 nut to secure the two parts but do not over-tighten the nut or the drum might get deformed.



Use a dremel tool with a metal cutting disc to cut off the part of the socket screw that is sticking out of the nut.

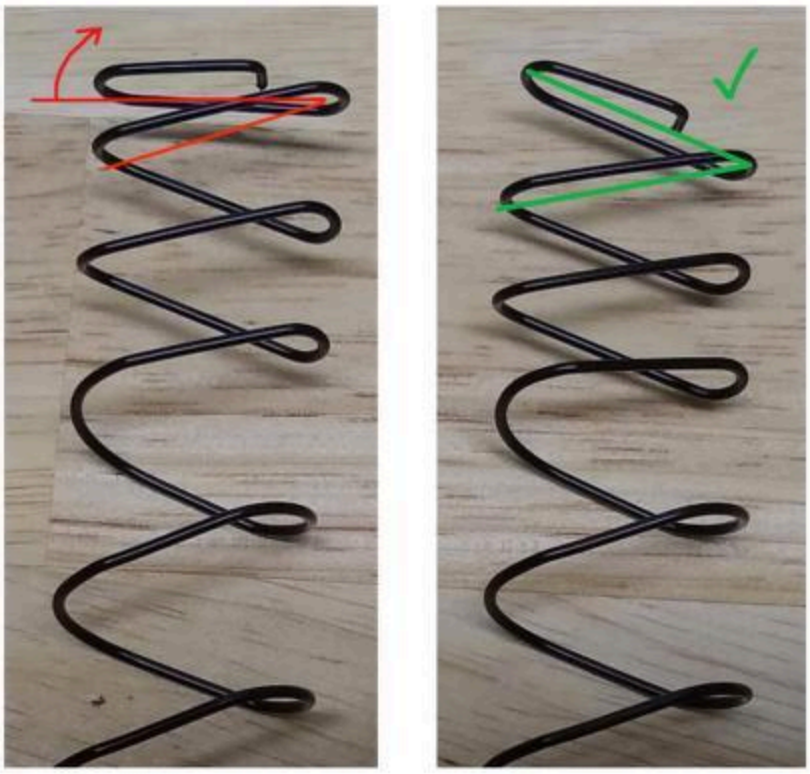
Remove the nut afterwards and then add some JB weld to the threads on the end of the screw.

Now screw the nut back on and then add some more JB weld onto the nut.

Let the JB weld dry for at least 12 hours before further use of the fire selector.

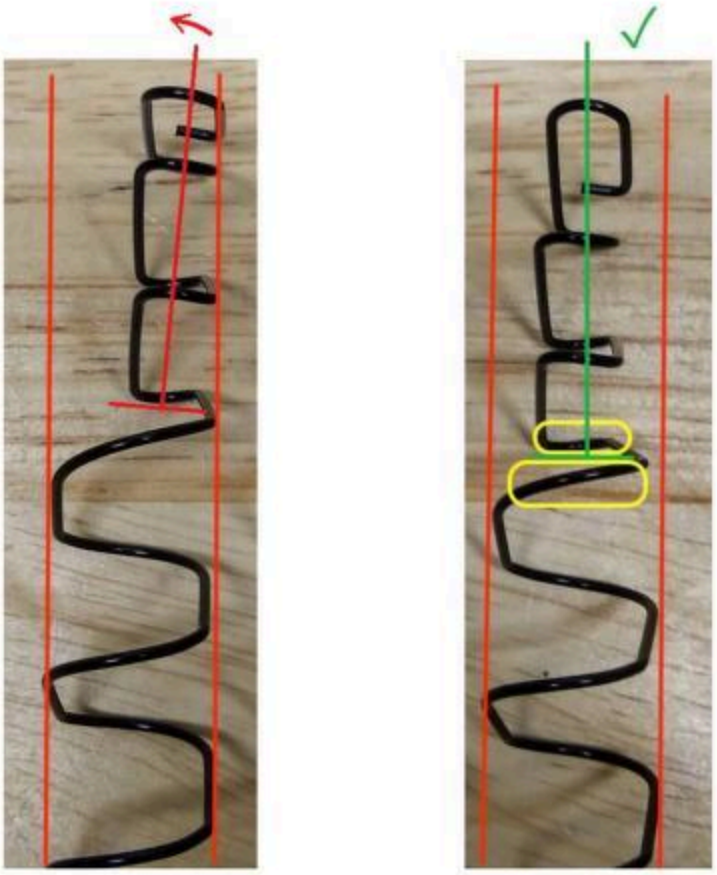
Modifying Chinese Glock Mag Springs

Text and pictures by BoostWillis



Instead of leaving it flat like in the picture on the left,

bend the top coil with your pliers upward to match the pitch of the coils below it like shown in the right picture.

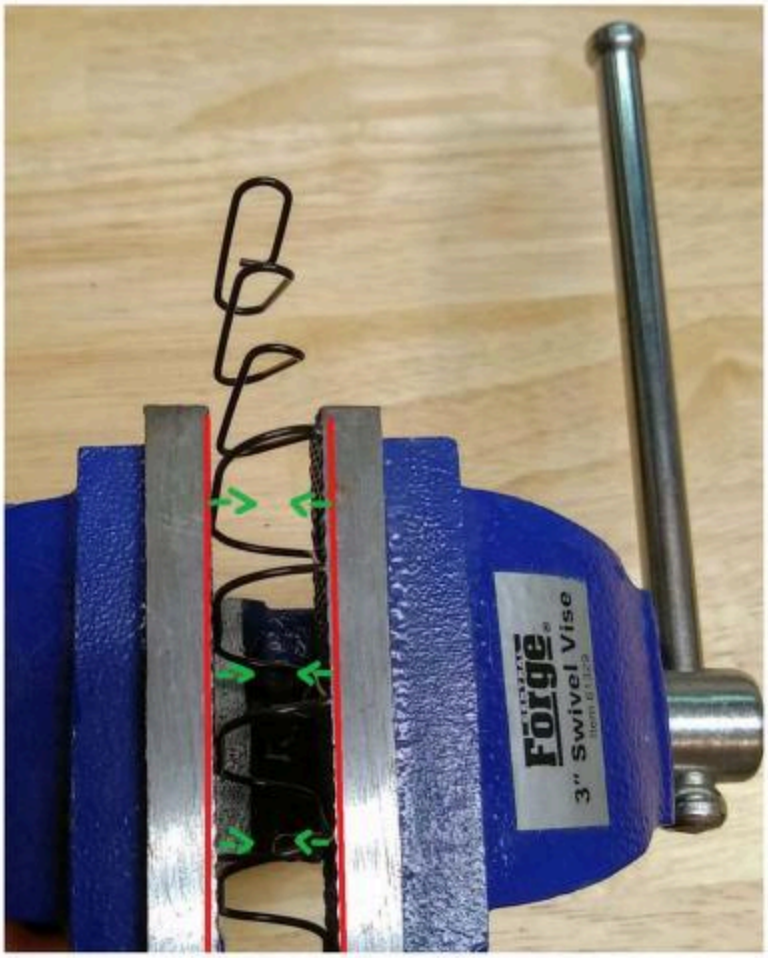


As you can see from the red guide lines, the spring in its initial state on the left has a bias toward one side.

Refer to the marked yellow boxes for where to bend the spring with your pliers to correct it.

You want the top narrower coils to be centered on top of the spring.

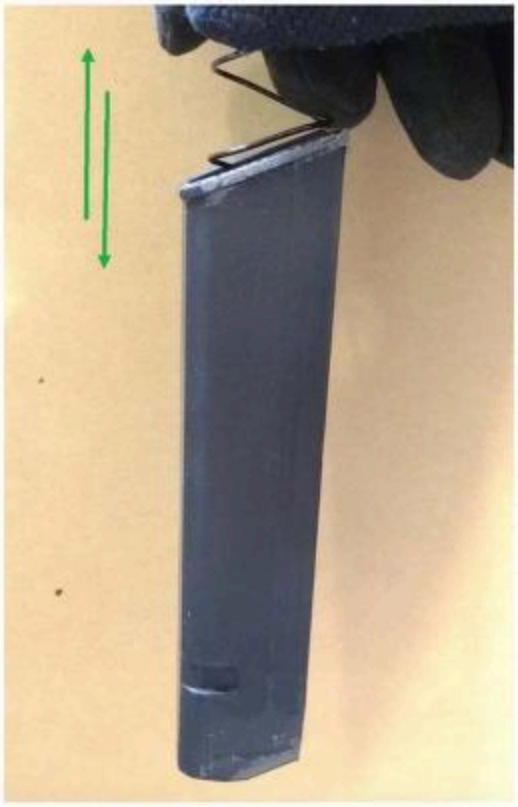
It doesn't have to be perfect.



Overall the spring is too wide causing unnecessary friction inside the mag and robbing you of useful spring pressure.

This is where the vise comes in.

Compress the spring in the vise as shown in multiple spots along its length.



Ignore the narrower coils toward the top of the magazine, but focus on the full width coils that make up the main section of the magazine spring.

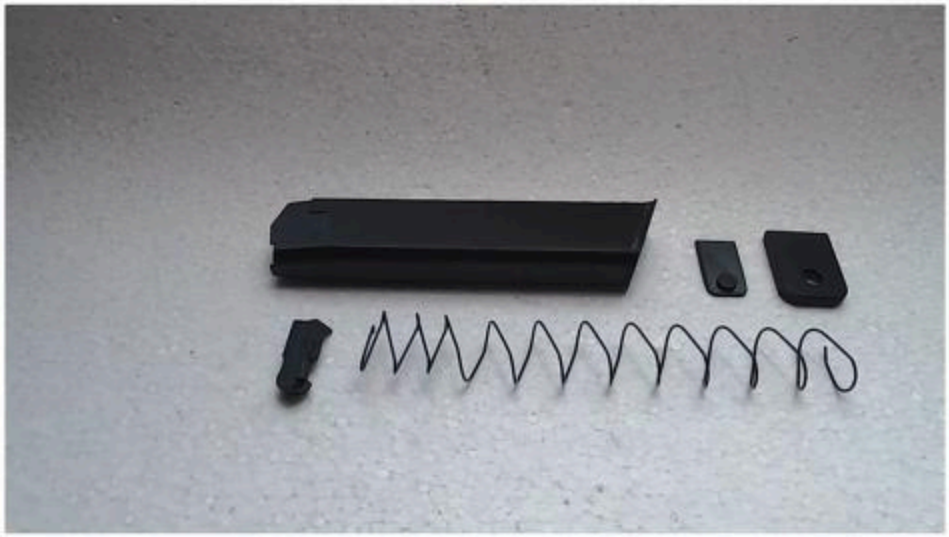
Use the magazine body as a guide.

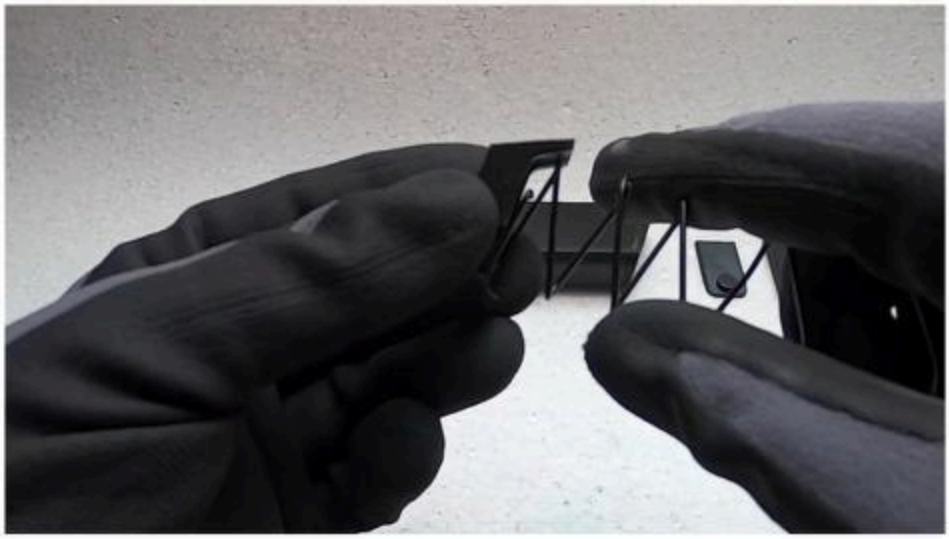
If you slide the spring into the magazine body and turn it upside down, you should be able to shake it out without too much effort.

You don't need to get it so narrow that the tube drops free.

Afterwards look down through the spring and identify any coils that might have rotated out of alignment with their neighbors and bring them back into alignment.

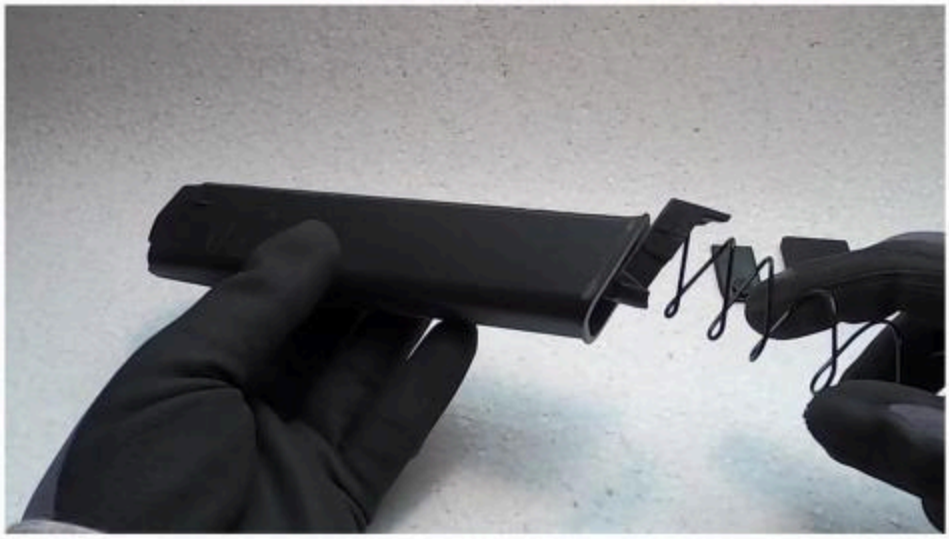
Assembling a magazine

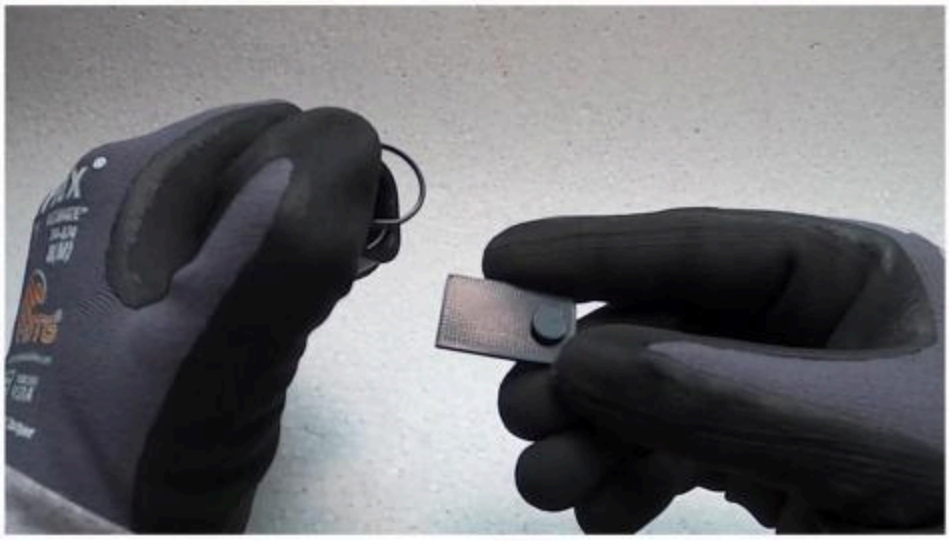




Gather a magazine body, a floor plate, a locking tab, a follower and the modified magazine spring.

Clip the follower on top of the narrow end of the magazine spring in the correct orientation.





Insert the magazine spring with the follower on top into the magazine body.

While keeping the magazine spring inside the magazine body push the locking tab onto the bottom of the magazine spring so that it ends up being flush with the bottom of the magazine body.

While pushing the magazine locking tab inside the magazine body against the magazine spring pressure, slide the magazine floor plate over the front on the bottom of the magazine body and have the round feature of the locking tab lock itself into the hole of the magazine floor plate.

Assembling the lower

Get the 4mm drill bit and hand ream the hole on the lower receiver that will hold the hammer pin. (Hole near magwell) Ream only as much as needed so the drill bit can go through. Do not ream any more than that, as this will cause issues.

DON'T REAM THE HOLE FOR THE TRIGGER PIN (OTHER HOLE) IF YOU CAN INSERT THE AR-15 TRIGGER PIN WITH SOME FORCE.
THE FIT FOR THE TRIGGER PIN HOLE NEEDS TO BE TIGHT.
A LOOSE TRIGGER PIN HOLE MAY CAUSE ACCIDENTAL BINARY FIRE.

Get the 9.5mm diameter drill bit and hand ream the hole on the lower receiver through which the fire selector will go into.

Ream only as much as needed so the drill bit can go through.

Do not ream any more than that, as this will cause issues.

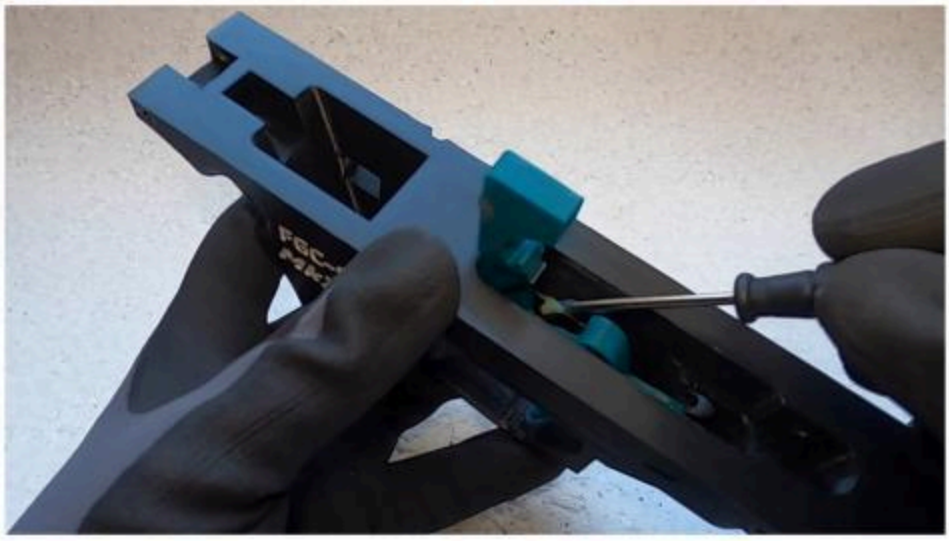
Put the trigger spring onto the trigger the way you see in the picture. Insert the disconnector spring into the trigger, if you haven't inserted it in there already. Push the disconnector in the shown orientation into the trigger and hold it onto it against the pressure of the disconnector spring.

Now hold that assembly together and insert it into the lower receiver. While pushing this assembly through the bottom hole for the trigger on the lower receiver, take your AR-15 trigger pin and push it through the lower receiver as well as the lined up trigger and the disconnector hole in the trigger.

Put the hammer spring onto the hammer as shown in the upper picture. This will be challenging for you at first, but you will manage.

Now push with the spring legs leading against the studs on the trigger in the way shown on the picture.

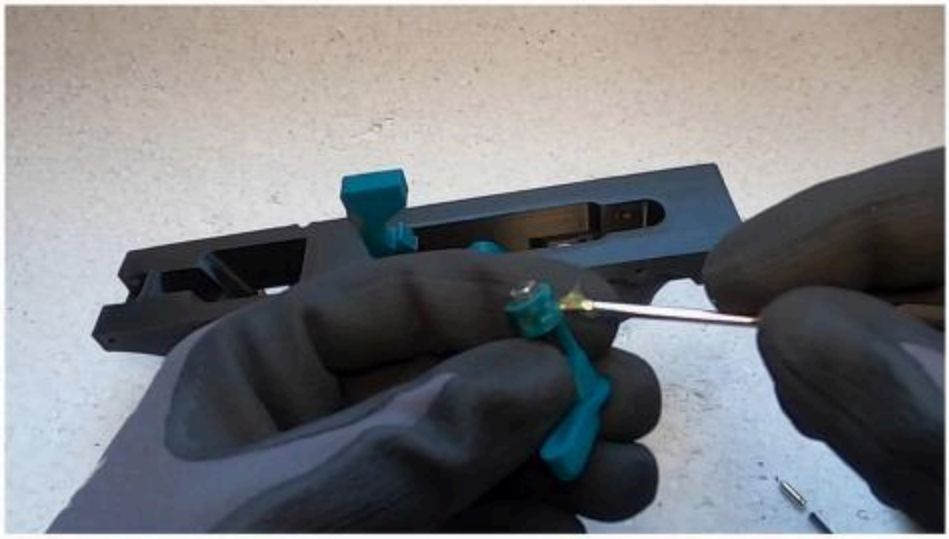
You will have to fight against that spring pressure.



While holding the hammer in position against the spring pressure, take the 4mm diameter DIN pin and push it through the dedicated hole while trying to align the hammer.

With the hammer in the up position apply grease to the area where hammer and trigger touch each other.

Apply grease to the sear at the back of the hammer as seen in the picture as well as some grease onto the top sear surface of the trigger.



Take the fire selector assembly and apply grease to the detent cutout area as you can see in the picture.

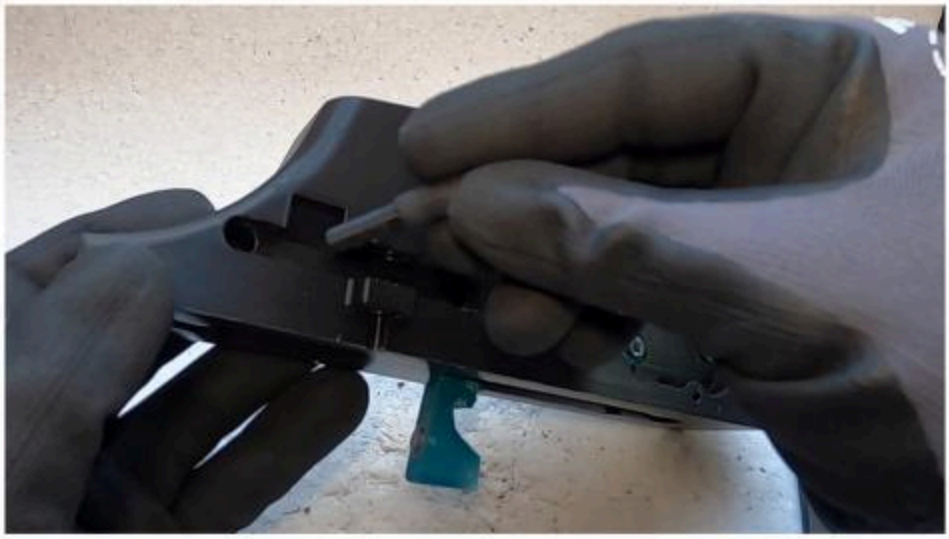
Now take the fire selector and push it through from the left side of the lower receiver as you can see it, in the picture.

With the fire selector in the position you see in the picture, hold the lever in place and then at the same time put the fire sector detent with the sharp tip first inside the hole at the bottomside of the lower receiver near the safety selector indicators.

Take the fire selector detent spring and put it into the dedicated hole inside the top of the pistol grip.

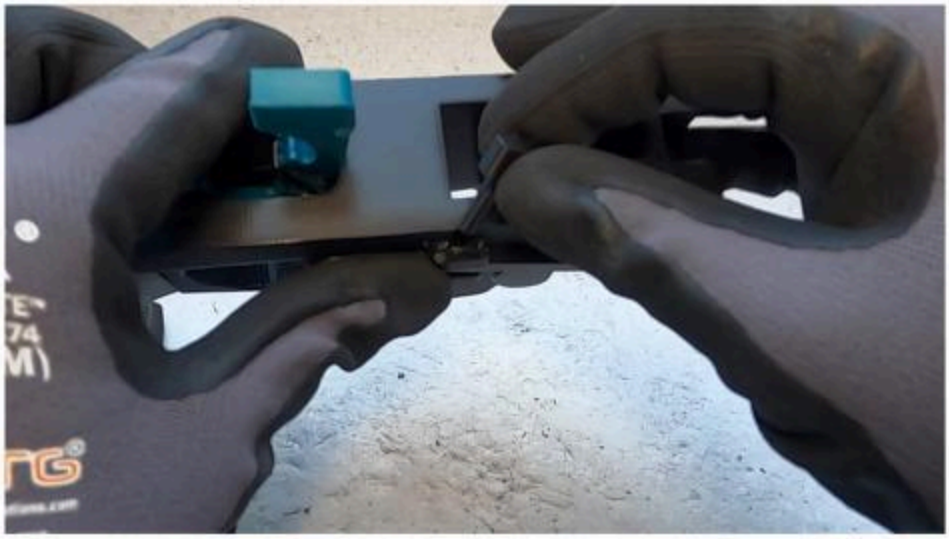
While making sure the fire selector is in the position mentioned previously and the fire selector detent still inside the hole, push the pistol grip onto its mating surface and make sure the fire selector spring goes against the bottom of the fire selector detent.

As you push against the spring pressure hold the pistol grip in place and use the Socket Head Screw M6,25mm along with the External-Tooth Lock Washer M6 DIN 6797 to screw the pistol grip into the lower receiver. After having done this, you may put the pistol grip lid into the bottom of the pistol grip in the case that you went with the 3D-printed pistol grip that is included with the FGC-9 MkII design.



Insert the magazine catch button into the hole you see in upper picture.

Insert the magazine catch spring into the hole as you can see in the picture.



Take the magazine catch bar and push it into its cavity against the spring pressure of the magazine catch spring and try to allign the hole on the bar with the hole on the lower receiver.

Push the magazine catch pivot pin through it.

Now take the feed ramp and put it in the orientation you can see in the lower picture, into its dedicated square slot on the top of the lower reciver near the front side.

While pushing down on the feed ramp as much as possible from the top, use the Socket Head Screw M3,12mm to screw the feed ramp into place with the appropriate allen key.

It is absolutely important that you pushed as much as you can from the top while screwing in the feed ramp to make sure that the the flat side on the top side of the feed ramp does not stick put past the top surface of the lower receiver.

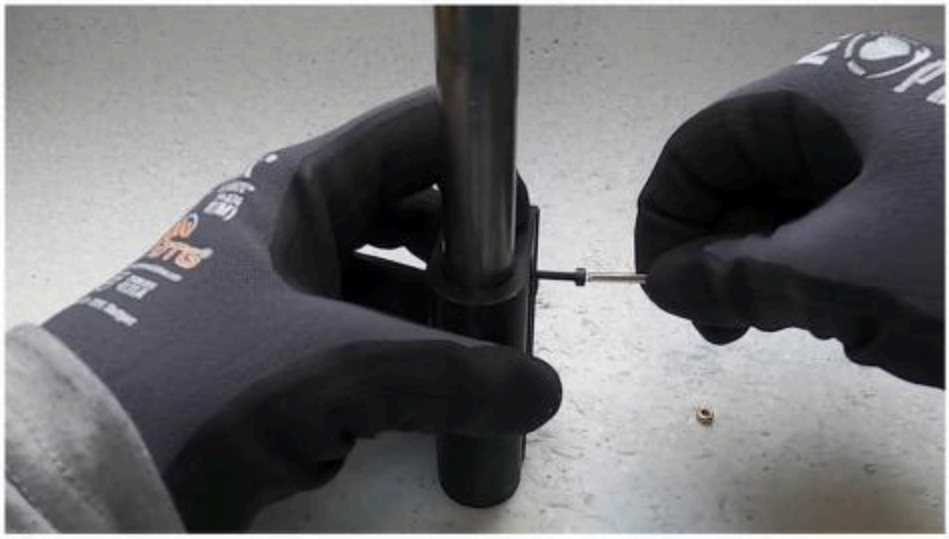
Failing to do so will potentially prevent you from assembling the lower receiver to the upper receiver and then later on cause issues with the feeding of cartridges.

Assembling the bolt assembly

Take your firing pin spring and shove it onto the firing pin.

You want the side that you didn't modify and which is still in factory condition to point towards the the tip.
The idea is, that the intact coil that is going to touch the inside of the bolt during function, will be less prone to catch on things at the back of the bolt.

You can now go ahead and shove the firing pin into the back of the bolt assembly.

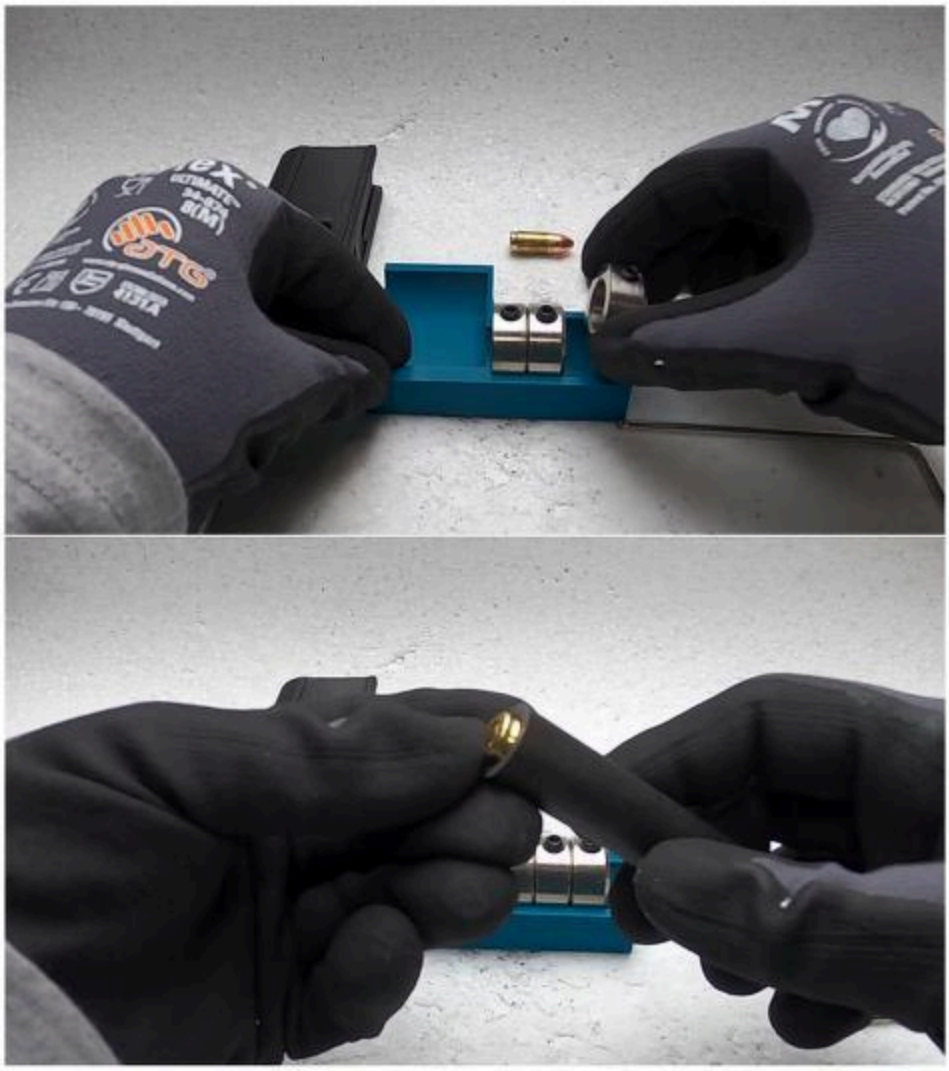


While making sure that the firing pin and spring do not fall out, tip the bolt assembly with the bolt face down and push against the back of the firing pin with your finger and insert the 20mm M3 socket head screw into the small hole on the left side of the bolt.

Use the appropriate hex key tool to screw the socket head screw as deep in as possible. Get your LOCTITE fluid/glue now and apply it to the threads of the screw that are sticking out, as well as on the inside of a M3 nut. Now screw the nut onto the screw properly with your socket tool while keeping the screw in place with the Allen key/appropriate hex bit tool.

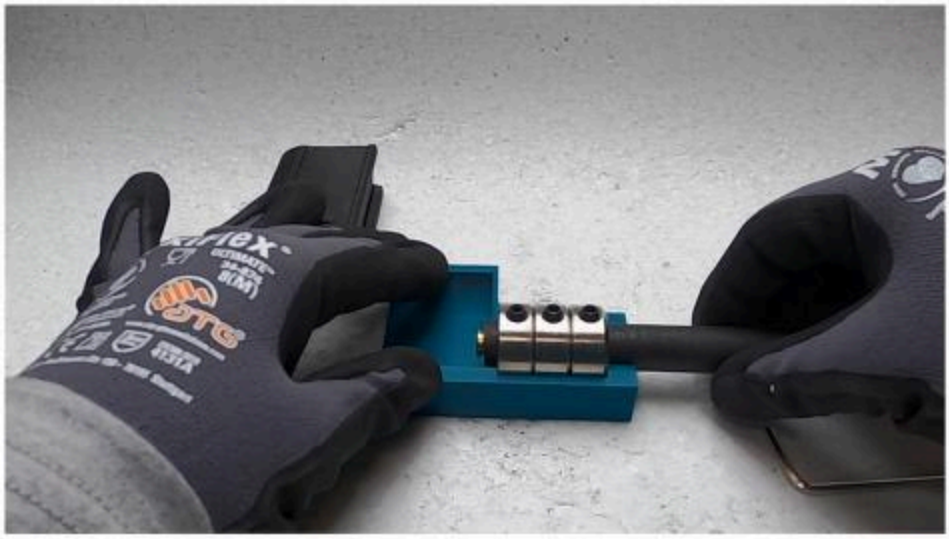
If you don't apply Loctite and don't tighten the nut properly, it may lead to the screw backing out and cause severe issues during the operation of your firearm, up to severe damage to the printed parts.

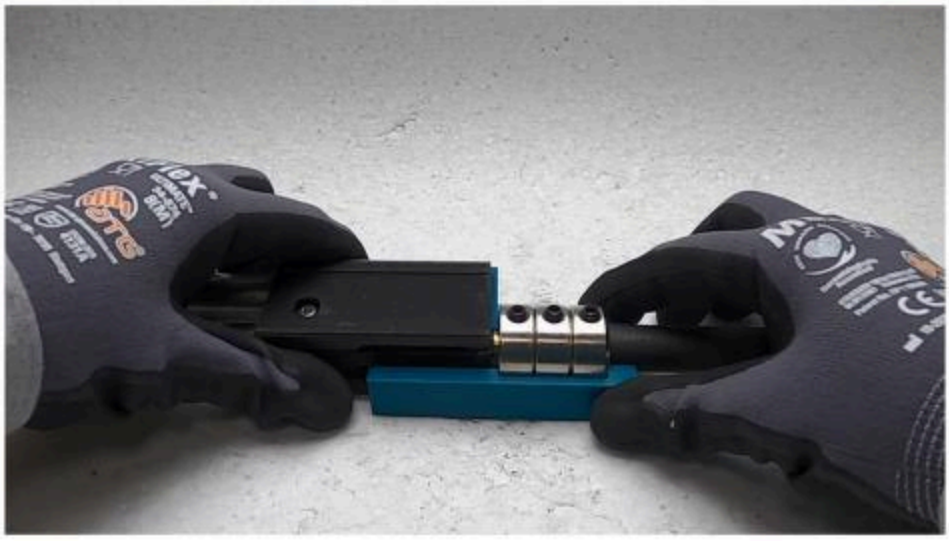
Assembling the barrel assembly



Get your headspacing jig and insert the three 16mm shaft collars into the shaft collar pocket.

Get your barrel and insert a case or cartridge into the chamber and make sure it is as deeply seated as possible. Make sure it does not back out.





Insert the barrel through the shaft collars from the right and let it stick out into the main cavity of on the left side as you can see in the picture.

You will then take your bolt assembly and slowly and carefully move it into the cavity until the bolt face makes contact with the inside of the cavity wall. Be sure to do this as slowly and meticulously as possible as to not move the case/cartridge and thus barrel further than it was than at the exact moment when the bolt face touched / kissed the end of the inside of the cavity.

Being extremely careful that you don't move anything apart from the bolt assembly, slide the bolt assembly out of the setup and immediately tighten the grub screw of the center shaft collar.

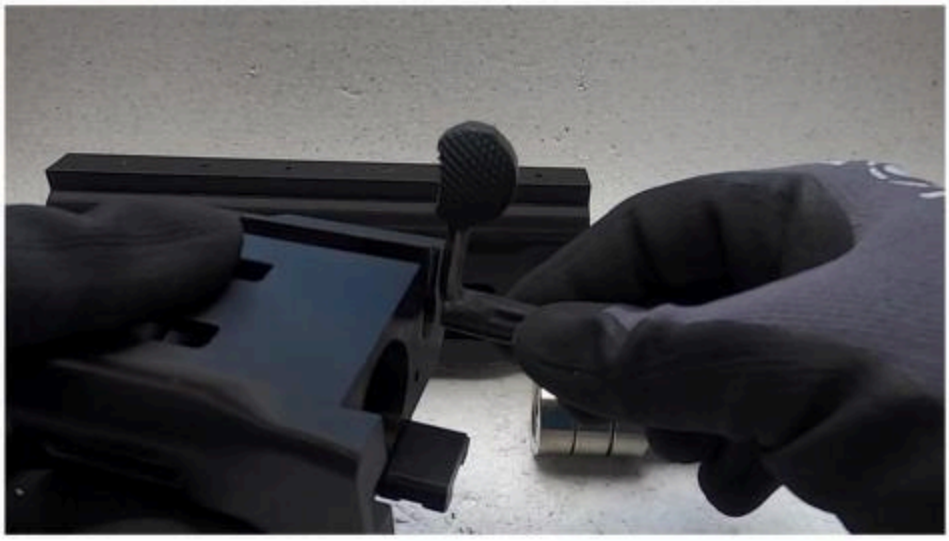
Then go ahead and tighten the first and third shaft collar to the same degree. Make sure you press the first and third shaft collar as close to the center shaft collar as possible as to keep everything as closely as possible so that the stack maintains its shortest possible length. Once the center shaft collar can not be moved anymore you then can go ahead and lift the barrel assembly out of the jig and tighten the grub screws as hard as you can. The barrel assembly is now assembled properly and your headspacing should be properly set.

Assembling the upper

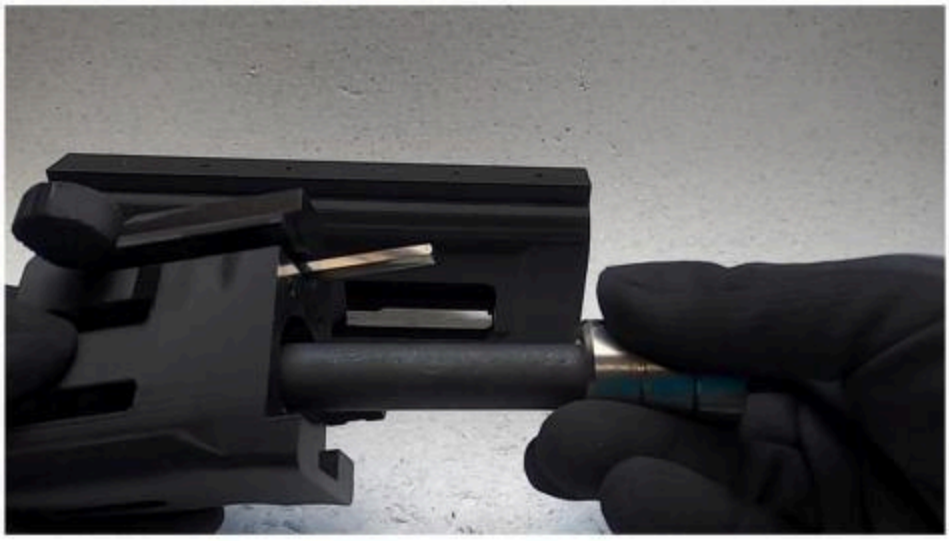
Take the ejector and try to get it into its designated slot on the inside of the upper receiver.
Make sure to put it in there in the shown orientation.

Align the hole on the ejector with the hole on the underside of the ejector cavity and screw the Socket Head Screw M3,16mm into place with the appropriate Allen key.

MAKE ABSOLUTELY SURE THAT YOU ARE USING THE 16mm LONG M3 SOCKET SCREW. If you accidentally screw in the screw for the bolt assembly for example into this place, you will damage the upper receiver.

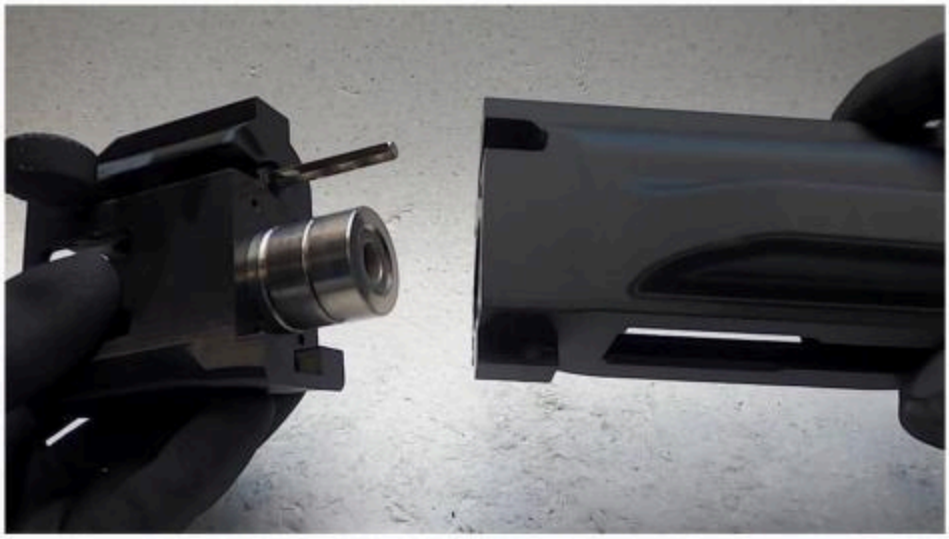


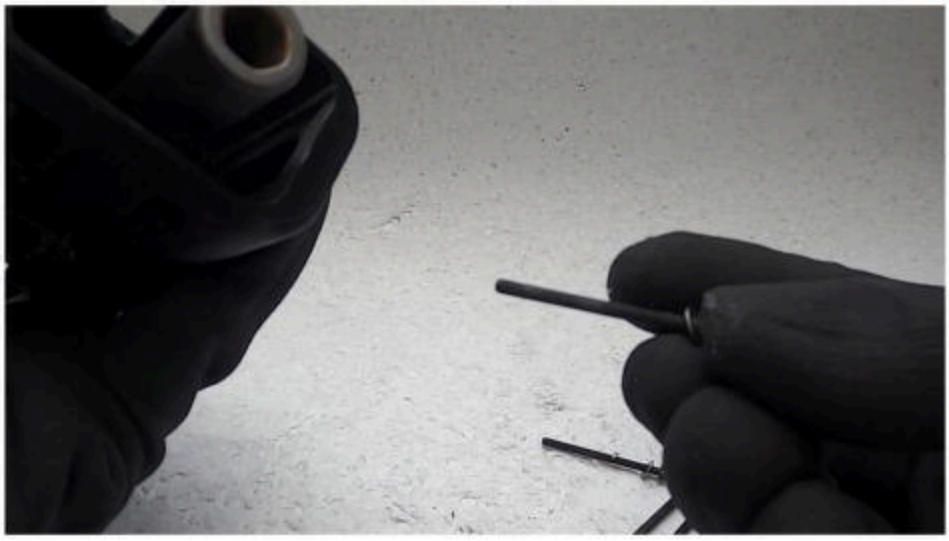
Having made sure you screwed the ejector into place and that the ejector is freely pivoting inside the upper receiver, get your charging handle and insert it into the barrel retainer in the orientation shown in the bottom picture.



If you have silicone spray on hand, spray silicone spray into the charging handle cavity on the barrel retainer.

Afterwards, get your barrel assembly and with the muzzle side first push it through the barrel retainer from the shaft collar pocket side.





Making sure that the charging handle is in place in the correct orientation and the barrel assembly sits inside its pocket in the barrel retainer, push the upper receiver onto the barrel retainer.
You may now take each of your 40mm M3 screws with each having a M3 washer on them and use them to screw the barrel retainer onto the upper receiver. Screw each screw lightly at first, then go clockwise or in a cross-diagonal manner screwing the screws tighter in an alternating manner. You may need to change extensions on your socket tools to reach all the way down into the barrel retainer cavity.

You might be unfortunate to have only access to socket tools that are too wide and thus won't be able to reach all the way down,
in that case try to look for alternate socket wrench tools until you find something that lets you screw down the screws firmly into place.

Take your top rail and place it on top of the upper receiver in the orientation shown in the upper picture.

Now take seven of your 16mm M3 socket screws and screw the top rail into place with the appropriate Allen key.

Assembling the stock assembly

Insert the secondary buffer spring into its dedicated slot at the bottom of the buffer tube. When you printed the buffer tube a piece of support that looks like a rod should have been left. Use that rod piece to push the secondary buffer spring firmly into place at the bottom of the buffer tube. To make sure it is firmly in place, try to shake out the buffer spring.

If it doesn't fall out while shaking the buffer tube violently, it is in place adequately. If the secondary buffer spring falls out while shaking, take your pliers and try to expand the last coil on the secondary buffer spring. Now you will be able to firmly re-insert it into the buffer tube and it should stay in place for sure.

Slide the stock over the buffer tube making sure that the L shaped feature of the stock points down into the direction of the hole at the end of the buffer tube. Your goal is to align the hole on the buffer tube end with the hole that goes through the main section of the stock.

You should now be able to use the 30mm long Socket Head Screw M4 to install the stock onto the buffer tube.

Making sure that the M4 screw is properly in place as you can see from the top picture, take the butt plate and hold it against the end of the stock.

Take your last two 16mm M3 socket screws and install the butt plate onto the stock.

Final assembly

If you have silicone spray on hand, spray it on the side and bottom surface of the bolt assembly.

Now push the bolt assembly into the upper receiver.

There is a trick to inserting the bolt assembly.
You will have to go through the underside of the upper receiver with your fingers and push the ejector against the inside of the upper receiver as you push the bolt assembly in.

Pull the bolt assembly slightly out of the upper receiver, as to make sure that you have room near the chamber area of the upper receiver.
This will make sure you can mate the lower receiver against the upper receiver and prevent the feed ramp from bumping into the bottom of the bolt.

After you have pushed the lower receiver up against the bottom of the upper receiver, you should be able to slide the lower receiver towards the front and this should let you properly mate the upper to the lower.
If you encounter issues during this process, you will realize that the feed ramp will be the main culprit. You will have to make sure you get the bolt out of the way first and do the aforementioned maneuver to butt the lower up against the main portion of the upper receive first, then slide the lower receiver forward and then finally be able to align the holes on the lugs of the upper receiver with the holes on the ends of the lower receiver.

Once you were able to align the holes, you can insert your last two 40mm M3 screws, along with M3 washers from one side of the lower receiver and then secure them on the other side with M3 nuts.

Once the lower is securely attached to the upper you can push the main buffer spring onto the long bolt piece towards the inside of the upper receiver.

Now push the stock assembly against the back end of the main assembly and secure it with the 4x 20mm M3 hex head screws making sure you include 4x M3 washers.

Make sure you push the stock assembly firmly against the backside of the main assembly while securing each screw. Not doing so may cause unnecessary stress to the first two or three screws as you are securing the last ones.
So make sure after you started screwing in the first screw, to constantly hold the stock assembly against the main assembly while screwing in the rest of the screws.

You have now completed your FGC-9 MkII build.

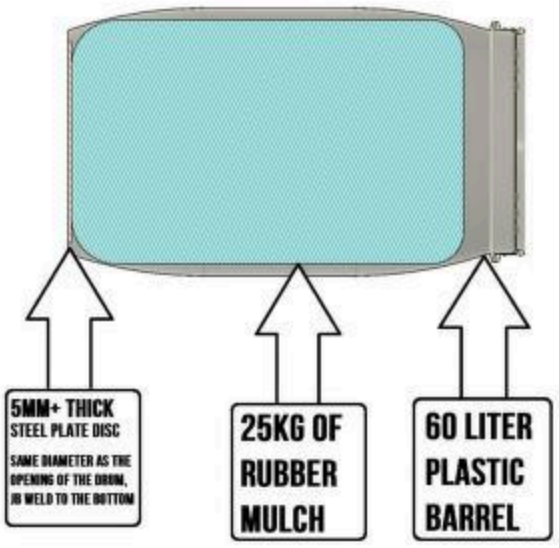
Test firing and maintenance

One of the questions you will ask yourself once you have completed assembly is where you will fire the first dozen shots to test your FGC-9 build.
Ideally you have a patch of land, a building, garage or similar facility that is very far from inhabited areas.

If you do not have access to a remote firing area you can use a basement.
The next question will be what you will shoot into.
This becomes especially tricky when firing in a basement.
One needs to fire into a so called bullet trap in that case.

A portable and easy to build solution is the following, a video of one being used is included in the media folder.

Take a 60-liter plastic barrel and fill it with around 25kg of rubber mulch. Before the rubber mulch is poured into the barrel you can JB weld a 5mm+ thick steel disc that has the appropriate diameter down at the bottom, inside the barrel, to guarantee that no pistol caliber projectile can leave the bullet trap. Use a plastic barrel that has a plastic lid so that you can simply use strips of electrical tape to cover the bullet hole entrances.


5MM+ THICK
STEEL PLATE DISC
SAME DIAMETER AS THE OPENING OF THE DRUM, JB WELD TO THE BOTTOM
25KG OF RUBBER MULCH
60 LITER PLASTIC BARREL

Test Firing

For the first few test shots I recommend you wear gloves and ballistic eyewear or a welding helmet.

Only load one cartridge for the very first test shot.

Make sure to check that the bullet has left the FGC-9 barrel and check that there are no cracks or damage of any form on the gun after each of the first dozen shots. Inspect the firearm very closely after each shot. If you encounter any issues while testing the firearm or later down the line refer to the troubleshooting page.

Maintenance & Repairs

When you have the spare time, brush the inside of your barrel with an appropriate brush from a cleaning kit and afterwards make sure that you have a film of lubrication oil inside the bore.

Use the occasion when cleaning your barrel bore, to also spray some silicone spray into the inside of your firearm (mainly inside the upper receiver where the bolt rides on), so that the parts that are printed, interact smoothly.

If anything breaks on your FGC-9, first try to replace the part by 3D-printing it again.

If that is not possible for you because of convenience or serious issues like time constraints and urgent need on the use of your FGC-9 you can resort to a technique called “PLA welding”.

Essentially you will take some PLA filament string and have it act like soldering material and use your soldering iron to melt the new PLA filament into a crevice or crack on your broken part. This is a very effective solution for repairing your 3D-printed parts.

If you can wait a day before you need the part, resort to using JB-Weld as a filler material/glue for broken areas. Using JB-Weld will result in a stronger repair. After it dries(12-24h) you can sand the repaired area first with rough, then fine grit sandpaper to ensure smooth function.

Troubleshooting

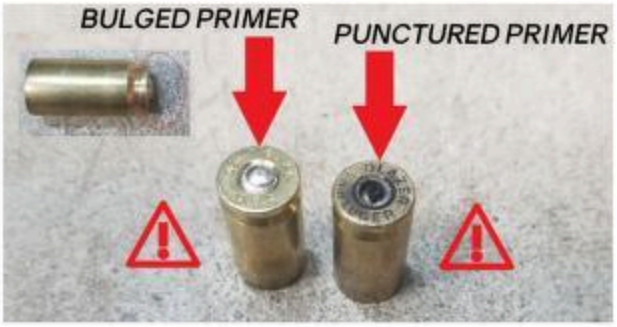
Text and diagrams by IvanTheTroll

Check your primers to determine,
whether your FGC-9 is functioning properly.

Good Primer Hits - Note the little to no bulging

Note these hits are a little off-center, this is about the furthest
off-center the hits can be before the gun won't work!

Slightly Bulged Primers, these might be ok,
but if the gun has extraction issues,
consider these primers to be bulged and follow the steps.



Dangerous degree of bulging or punctured/ruptured primers,
refer to the diagrams to identify the causes of these issues.

When it comes to the issues the FGC-9 may face, two stand out as most common:

Failures to extract (the fired casing does not leave the chamber)

Issues with the firing pin(the primer on the cartridge is hit but does not ignite, or the firing pin is poking holes all the way through primers)

These steps will walk you through the tips and tricks that have been shown to help alleviate or completely solve these issues

Troubleshooting Failures to Extract

The most common causes of FTEs(Failures to Extract) are:
a poorly cut/misshaped chamber and/or an issue with headspacing.

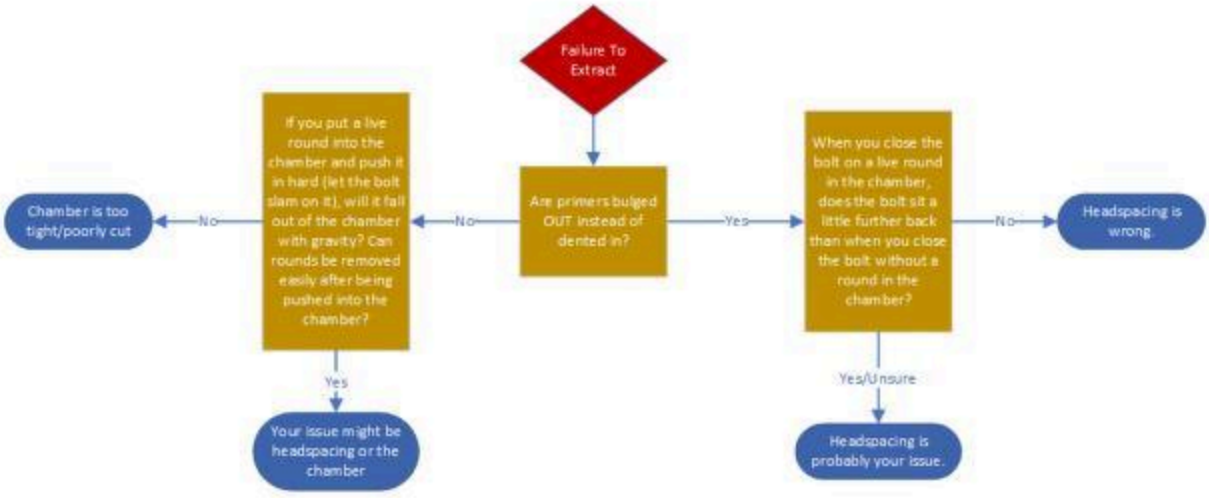
The frustrating part about solving this issue is that it's hard to be sure exactly which part (the chamber or headspacing) is to blame for your FTEs.

Do note that these steps/instructions are meant for troubleshooting guns that are using barrels made via the ECM process -if you have these issues using a factory or reamed chamber, then your issue might be due to your firing pin.

Skip to the section about firing pin issues and follow those steps.

This flow diagram should help you identify what your issue might be.

Based on which answer you arrive at in the flowchart, follow the instructions after the flowchart.


Failure To Extract
Are primers bulged OUT instead of dented in?
Yes
No
When you close the bolt on a live round in the chamber, does the bolt sit a little further back than when you close the bolt without a round in the chamber?
No
Headspacing is wrong
Yes/Unsure
Headspacing is probably your issue.
If you put a live round into the chamber and push it in hard (let the bolt slam on it), will it fall out of the chamber with gravity? Can rounds be removed easily after being pushed into the chamber?
No
Chamber is too tight/poorly cut
Yes
Your issue might be headspacing or the chamber

Chamber is too tight/poorly cut

First off –if you made your barrel following the ECM process and you didn't use a tapered chambering rod, understand that this issue is usually best resolved by using a tapered chambering rod. If you didn't use the ECM process to make your barrel and the flowchart lead you here, there are two things that can be wrong with your chamber that can cause FTEs.

One is that the chamber itself being too tight –this can best be resolved by cutting for 10 more seconds on the chamber (assuming you used the ECM setup to make your barrel). The other thing is that your chamber seat is very curved/poorly defined. You will be able to tell which of these two things is happening by taking a live round and letting the bolt slam it into the chamber. Take the round out and look at it. If the round is shiny around the case mouth (where the bullet sits inside the case), then your chamber seat is poorly defined. If the case mouth looks good, then it's most likely that your chamber is just too tight (especially if anywhere on the case that isn't the case mouth is shiny).

If you determine that your chamber is just too tight, go back to your ECM setup and cut for 10 more seconds, then repeat the process of checking if the chamber is too tight. If you determine that your chamber seat is to blame, you probably cut your throat too wide during the ECM process (stick closer to the specs in the documentation next time). You will probably have to redo you barrel.

However, you can still try the troubleshooting tips in the "Headspacing is wrong" section if you would like to make absolutely certain it is your chamber that is the issue.

Your issue might be headspacing or the chamber

This is the worst spot to be in. I recommend you follow the steps from the next section first, and if that doesn't solve your issue, follow the steps in the section above this one. There's no good way to tell what's going wrong with your build, so you'll have to check both–however, the only time one of my builds ended up in this spot is when I had a proper chamber, but I had too little headspacing (read the next section to understand what this means).There is also a small chance your issue is your firing pin itself–refer to the "Firing Pin Troubleshooting" section below if you suspect this is the case.

Headspacing is wrong / Headspacing is your issue

This is probably the easiest issue to check/resolve.First, you'll need to understand what "headspacing" is. Headspacing refers to the distance between the face of the bolt and the rear end of the cartridge case. When speaking in terms of the FGC-9, LESS headspace means that the barrel is moving rearwards (towards the bolt), MORE headspace means the barrel is moving forwards (away from the bolt). Too little headspacing means that that bolt will ram a cartridge hard into the chamber, and it will be the cartridge itself in the chamber the stops the bolt. Too much headspacing means that the bolt won't actually be touching the rear end of the cartridge (or it will only barely be touching it) –this is what would cause bulged primers and could potentially be dangerous. Perfect headspacing is where the bolt will push the cartridge fully into the chamber and be resting against both the rear end of the cartridge AND the front wall of the upper receiver at the same time. The steps that follow describe how to help make sure your headspacing is where it is supposed to be.

On the FGC-9, you'll want your headspacing to be 0.00mm or less (meaning the bolt is resting against the rear end of the cartridge). However, you want your headspacing to be as close to 0.00mm as possible. You can establish this using the FGC-9 headspacing jig, but sometimes the headspace you set with that tool won't be quite perfect –you may still need to decrease headspace some.
Always start with the headspacing that you set on the jig, and after testing you can adjust from there.

The jig should never be causing too little headspace –if you suspect your issue is having too little headspace, reset your barrel using the jig and confirm it before moving the barrel forward.

NOTE: If you suspect you have too much headspacing (which can happen sometimes after using the jig), firstcheck that the bolt is not getting stopped by the charging handle –when the bolt is all the way forward, the charging handle should NOT be touching the bolt face. The easy way to check this is to let the bolt and charging handle go all the way forward.

The charging handle should be able to move forward and backward a little without moving the bolt at all. If your charging handle is touching the bolt when the bolt is closed, you should grind down the long leg on your charging handle or drill the recess in the bolt face a little deeper.

Finally, if you've made sure that you started with a barrel that was set up on the headspacing jig, and that the charging handle is not touching the bolt face when the bolt is closed, you are ready to make a change to your headspace. Remove the barrel and shaft collar assembly. Make a visual note of where the barrel sits in relation to the shaft collars. Loose the sets screws on the shaft collars. Move the barrel rearward (towards where the bolt would be) relative tothe shaftcollars.If the shaft collars feel tight or the barrel won't move in them, make sure the set screws are loosened and tap the barrel with a hammer to move it.

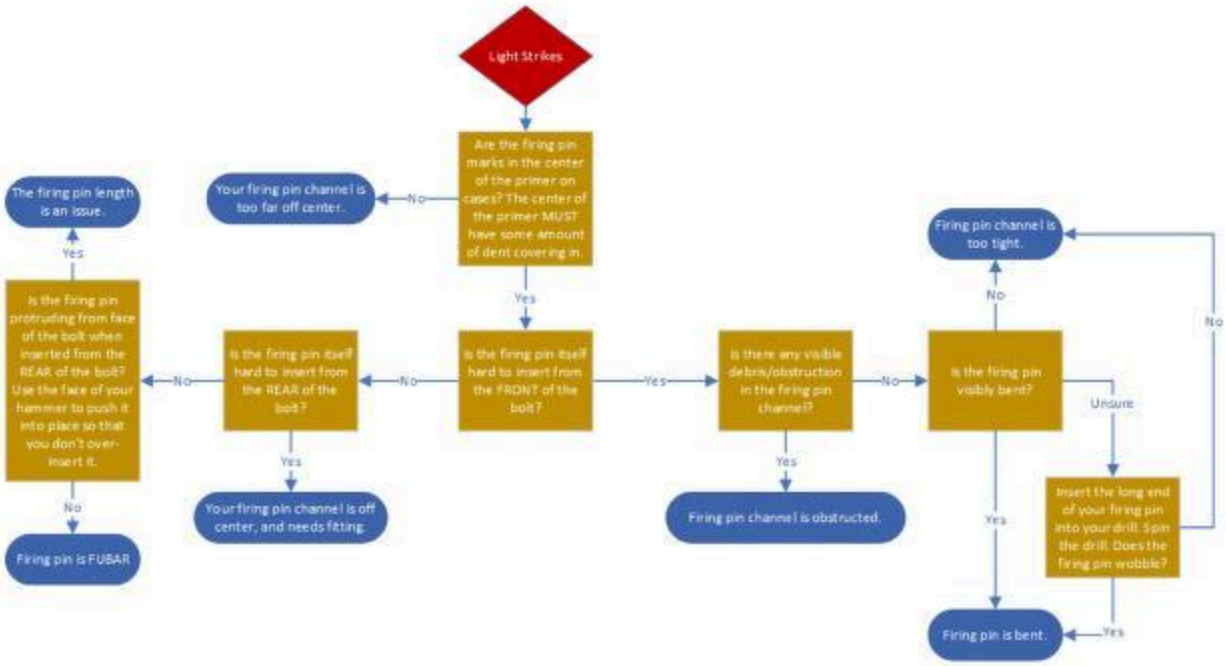
After ensuring that the barrel has moved backward a little (when I say a little, I mean like 0.5mm –it only needs to move a tiny amount), tighten the shaft collars and reinstall the barrel. If primers are still getting bulged or you are still having FTEs, follow the flowchart again.

Firing Pin Troubleshooting

If you are experiencing light primer strikes, ruptured primers, or a failure to extract that you could not solve by following steps from the flowchart above, this section should be able to help you. First off –the FGC-9 runs best with about 2mm of firing pin extension. This value does not need to be very precise, and depending on your setup and ammo used, a firing pin with as little as 1mm of extension or as much as 3mm of extension might work fine. This section will help you fix issues with your firing pin.

Light Strikes

The most common cause for light primer strikes (the primer get hit but the round doesn't go off) is that something is wrong with the firing pin. There is a small chance that the issue is headspacing (covered in the "Troubleshooting Failures to Extract (FTE)", so be aware your barrel might be set too far forward in the shaft collars – but don't worry about changing this until you've made sure your firing pin is correctly set up. This flow diagram should help you identify what your issue might be. Based on which answer you arrive at in the flowchart, follow the instructions after the flowchart.


Light Strikes
Are the firing pin marks in the center of the primer on cases? The center of the primer MUST have some amount of dent covering in.
No
Your firing pin channel is too far off center.
Yes
Is the firing pin itself hard to insert from the FRONT of the bolt?
No
Is the firing pin itself hard to insert from the REAR of the bolt?
Yes
Your firing pin channel is off center, and needs fitting.
No
Is the firing pin protruding from face of the bolt when inserted from the REAR of the bolt? Use the face of your hammer to push it into place so that you don't over-insert it.
Yes
The firing pin length is an issue.
No
Firing pin is FUBAR
Yes
Is there any visible debris/obstruction in the firing pin channel?
Yes
Firing pin channel is obstructed.
No
Is the firing pin visibly bent?
No
Firing pin channel is too tight.
Yes
Firing pin is bent.
Unsure
Insert the long end of your firing pin into your drill. Spin the drill. Does the firing pin wobble?
Yes
No

Your Firing Pin Channel is too far off Center

This is an annoying situation to be in. I've tried a huge number of things to try and fix this problem, but the only real solution is to make a new bolt. Pay very close attention to drilling the firing pin channel straight and ensure that the end of the lower bolt rod (the one with the firing pin channel) that you drilled into (the side facing up in the jig) is the side of the rod that faces forward whenever you mate your rods together.

The Firing pin Length is an Issue

First thing –check that your firing pin has the correct overall length(about 67.50mm).
If your firing pin is too long or too short, you can have light strikes. Go back to the firing pin documentation and ensure all the dimensions in the instructions line up with your firing pin. If either end of your firing pin is too long, you can trim it down slightly and check if that fixes your issue. If either end of your firing pin is too short, you will need to make a new firing pin and pay closer attention to the instructions –more often that not, it's getting the shaft collar in the right spot that is the issue.

Firing Pin is FUBAR

If you ended up here, your firing pin channel is either over 3mm off or your firing pin is totally wrong. Assuming your bolt isn't way off, then you need to redo your firing pin and slow down to read the documentation/get the measurements right.

Firing pin Channel is too Tight

Take the drill bit you used to drill out your firing pin channel. Using your drill, drill from the front of the bolt, spinning the drill at a high speed while moving it in and out of the hole. Apply a little silicone oil to the firing pin hole and test again.

Your Firing Pin Channel is off Center and Needs Fitting

So –your firing pin channel is off center, but at least some portion of your firing pin indent is still hitting the middle of the primer. You may be having inconsistent primer hits because your off-center firing pin channel is causing the shaft collar on the firing pin to drag against the internal cavity of the bolt housing. Inspect your firing pin/bolt housing and look to see if the shaft collar is in contact with the bolt housing. If it is, you can use a rotary tool/Dremel tool/drill to try and remove a little material from the bolt housing so that the firing pin shaft collar won't be dragging against the bolt housing. Just be careful not to remove too much material!

Firing pin Channel is Obstructed

Take the drill bit you used to drill out your firing pin channel. Using your drill, drill from the front of the bolt, spinning the drill at a high speed while moving it in and out of the hole. Apply a little silicone oil to the firing pin hole and test again.

Firing pin is Bent

This is an indicator that your headspace might be wrong or your firing pin might have been too long -a firing pin that is too long, especially when headspace isn't right, can puncture primers, which can bend firing pins.
If your firing pin has bent, you can try to straighten it back out (and then shorten it to the specs called out in the documentation), but I recommend you make a whole new firing pin. Refer to the previous section (Troubleshooting Failures to Extract (FTE)) to check your headspace, and refer to the documentation for making a new firing pin/straightening your old one.

Punctured Primers

If you are having punctured primers, you should stop using your FGC-9 and fix this issue. The two things that could cause punctured primers are an issue with headspace and a firing pin with too much extension(too long). If you have punctured primers, first make sure headspace is set correctly -refer to the previous section (Troubleshooting Failures to Extract (FTE)). If you still have punctured primers after ensuring headspace is good, then you will need to make a new firing pin (or identify which end of your firing pin is too long and trim it down to size according to the instructions for making your firing pin).

Failure to Extract due to Firing Pin

This issue is rather uncommon, but I have noticed it before. You can have failures to extract because a firing pin has too much extension. The quick and easy way to check this issue out is to measure how much extension your firing pin has. The best way to do this is to remove the barrel from your gun and let the hammer hit the firing pin -when it comes to a rest, it will be pushing the firing pin to its extended position. While looking from the front of the gun (with the barrel removed), take a note of how far the firing pin is sticking out past the face of the bolt -it should only be 1 or 2mm. If it is sticking out a long distance, you might want to make sure that the tip of the firing pin isn't pointed (it should be a flat shape on the tip), and make sure to grind it down a little so that about 2mm of the firing pin is sticking out past the bolt face.

[3] Thermate Formula

FORMULAS 196 AND 197

Thermate

	196 %	**197** %
Aluminum, granulated JAN-A-512, Grade II 100% —12 mesh; max. 3% —140 mesh	16	19
Aluminum, grained JAN-A-512, Grade I 100% —50 mesh; max. 97% —200 mesh	9	3
Black Iron Oxide MIL-I-275A, Grade B 10% max. —140 mesh	44	51
Barium Nitrate MIL-B-162, Class 5 99% —12 mesh; 5% max. —200 mesh	29	22
Sulfur JAN-S-487, Grade E	2	—
Resin, Low Pressure Laminating MIL-R-7575, QPL 7575 Alkyd-Styrene	—	5

The granulated aluminum and the black iron oxide in both formulas can be added combined as *Thermite, Plain Incendiary*, MIL-T-407A (1952). The resin in Formula 197 is usually the commercial resin

[4] Pyro Valences

Element	Pyro Valence	Assumed Product
Aluminum, Al	+3	Al_2O_3
Barium, Ba	+2	BaO
Boron, B	+3	B_2O_3
Calcium, Ca	+2	CaO
Carbon, C	+4	CO_2
Chlorine, Cl	–1	HCl, KCl, other metal chlorides
Chromium, Cr	+3	Cr_2O_3
Fluorine, F	–1	HF, MgF_2, other metal fluorides
Hydrogen, H	+1	H_2O
Iron, Fe (in oxidizer)	0	Fe
Iron, Fe (as a fuel)	+3	Fe_2O_3
Magnesium, Mg	+2	MgO
Nitrogen, N	0	N_2
Oxygen, O	–2	H_2O, metal oxides
Potassium, K	+1	K_2O, KCl
Silicon, Si	+4	SiO_2
Sulfur, S	+4	SO_2
Titanium, Ti	+4	TiO_2
Zirconium, Zr	+4	ZrO_2

TABLE 2.7
Pyro Valences of Some Common Fuels and Explosives

Compound	Valence	Reaction Products
Fuel oil, $-(CH_2-CH_2)-$ (unit mass = 28 grams/mole)	+12 per unit	CO_2, H_2O
Glucose, $C_6H_{12}O_6$	+24	CO_2, H_2O
Polyvinyl chloride, $-(CH_2-CHCl)-$ (unit mass = 62.5 grams/mole)	+10 per unit	CO_2, HCl, H_2O
TNT, $C_7H_5N_3O_6$	+21	CO_2, H_2O, N_2
RDX, $C_3H_6N_6O_6$	+6	CO_2, H_2O, N_2
EGDN, ethylene glycol dinitrate $C_2H_4N_2O_6$,	0! (stoichiometric)	CO_2, H_2O, N_2
Nitroglycerine, $C_3H_5N_3O_9$	–1 (O rich)	CO_2, H_2O, N_2
Sodium azide, NaN_3	0	Na, N_2 (extra energy can be obtained if the sodium metal product is oxidized to Na^+ by an oxidizer)

TABLE 2.6
Pyro Valences for Some Common Pyrotechnic Oxidizers

Oxidizers	Valence	Products
Potassum nitrate, KNO_3	–5	K_2O, N_2, oxide/fuel
Potassium perchlorate, $KClO_4$	–8	KCl, oxide/fuel
Potassium chlorate, $KClO_3$	–6	KCl, oxide/fuel
Ammonium perchlorate, NH_4ClO_4	–5	N_2, H_2O, HCl, oxide
Barium nitrate, $Ba(NO_3)_2$	–10	BaO, N_2, oxide/fuel
Iron(III) oxide, Fe_2O_3	–6	Fe, oxide/fuel
Barium chromate, $BaCrO_4$	–3	BaO, Cr_2O_3, oxide
Red lead oxide, Pb_3O_4	–8	Pb (valence = –2 if PbO is formed)
Ammonium nitrate, NH_4NO_3	–2	N_2, H_2O, oxide

[note: +6 for RDX is wrong, it is actually 0. RDX is oxygen balanced itself, because the C goes to CO rather than CO_2, which makes C +2 rather than +4.] [and fuel is +6 not +12]

Fuel Capacity of Some Common Binders

Binder	Monomer Unit	Grams/Unit	Pyro Valence/Unit	Pyro Valence/ Gram
Paraffin	C_2H_4	28	+12	+0.429
Polybutadiene	C_4H_6	54	+22	+0.407
Waxes	$\sim C_{36}H_{72}O_2$	536	+212	+0.396
Linseed oil	$\sim C_{17}H_{36}O_2$	272	+100	+0.368
Polyvinyl alcohol (PVA)	C_2H_4O	44	+10	+0.227
VAAR (vinyl alcohol–acetate resin)	$C_6H_{10}O_3$	130	+28	+0.215
Polyvinyl acetate	$C_4H_6O_2$	86	+18	+0.209
Laminac	$\sim C_{20}H_{16}O_9$	400	+78	+0.195
Polyvinyl chloride (PVC)	C_2H_3Cl	62.5	+10	+0.160
Dextrine, starch, and gums	$C_6H_{10}O_5$	162	+24	+0.148
Viton®	$C_2H_2F_2$	64	+8	+0.125
Alloprene (Parlon®)	$C_{10}H_{11}Cl_7$	380	+44	+0.116
Nitrocellulose	$C_{12}H_{15}N_5O_{10}$	389	+43	+0.111 (12.5% N)
Teflon	C_2F_4	100	–4 (→ C)	–0.040

[5] Engager's guide to 5-aminotetrazole

Original post:
https://www.sciencemadness.org/talk/viewthread.php?tid=14342

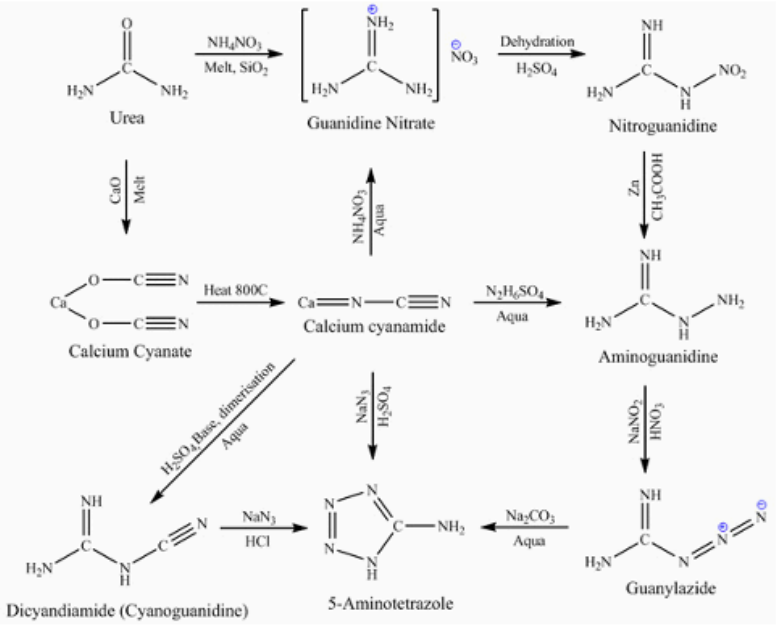
Pdf-link:
https://www.sciencemadness.org/scipics/Engager/TzOTC/Synthetic%20routes%20to%20tetrazole%20compounds%20based%20on%20OTC%20materials.pdf

Second Pdf link (make a free trial subscription, download and then cancel the subscription):
https://www.scribd.com/document/779497474/Synthetic-routes-to-tetrazole-compounds-based-on-OTC-materials

I also saved the document in this appendix:

Synthetic routes to tetrazole compounds based on OTC materials by Engager

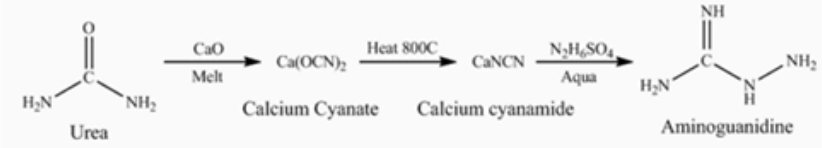
As one may know tetrazoles are class of highly energetic nitrogen based materials. This compounds combine an unique set of properties, attracting much attention in modern research for primary explosives. However relatively difficult preparation of source products, made this extremely interesting class of compounds hardly accessible for amateur chemist. However it will be shown below that even such complex compounds can be made in home with little effort. The main source product for all variety of tetrazoles is 5-aminotetrazole, witch can be made in two general ways – by Schtolle's method (from cyanamide or dicyandiamide and hydrogen azide) and by Thiele's method (by diazotizing aminoguanidine with nitrous acid in strong mineral acid medium). Since sodium azide is not common in amateur chemistry due to high cost and toxicity, route through aminoguanidine seems much more laborious for amateur chemist use. Genetic structure of 5-aminotetrazole is shown on scheme below:



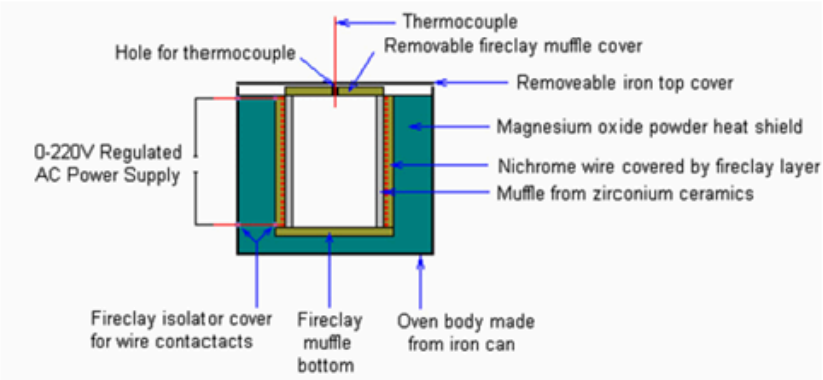
Aminoguanidine itself can be produced in two different routes, both including intermediates witch can be interesting not only in terms of production of aminoguanidine but also by themselves. First route is nitroguanidine route, it consists in melting urea with ammonium nitrate in presence of silicagel catalyst to produce guanidine nitrate, dehydration of guanidine nitrate by sulfuric acid to produce nitroguanidine and reduction of later by means of zinc dust in acetic acid. Main disadvantages of this route are: explosion hazard of melting urea and ammonium nitrate if reaction conditions are not controlled property, quite difficult nitroguanidine reduction procedure requiring zinc dust and glacial acetic acid. Second route is cyanamide based, it consist in melting urea with calcium oxide to produce calcium cyanate witch can be decomposed at high temperature to form calcium cyanamide, reaction of later with hydrazine sulfate in aqueous media leads to formation of aminoguanidine. The main difficulty on this route is requirement of high temperature and some additional efforts to isolate cyanamide from the air oxygen in course of production to produce high quality calcium cyanamide required by final step. Below i will describe both reaction routes as well as procedure of conversion of

aminoguanidine to 5-aminotetrazole in final section. I hope this materials will help reader to find his personal route to produce and study this interesting classes of nitrogen organic compounds.

Chapter 1 – Aminoguanidine, cyanamide route



Step №1. Constructing 900°C electric furnace. In general the oven consists of ceramic fireproof muffle tube, covered by nichrome wire heating element, covered by radial fireclay layer which ensures that main heat flow is directed to opposite direction – into the muffle. To prevent heat losses to environment and allow heating to high temperature the whole construction is protected by heat shielding. Temperature in the muffle is measured by means of thermocouple. Heat wire is powered by AC power supply which allows voltage regulation – this will allow temperature regulation inside the muffle by regulating heat flow from heat element.



Heating Element. Heating element consists form fireproof ceramic muffle, covered with nichrome wire of long lenth. Materials for furnace muffle must be stable at high temperature, have high electric resistance and resistance to heat shock. Ceramic tubes from $ZrO_2/MgO/Al_2O_3$ based ceramics are essential for the job. In will be impossible or very hard to make this one by yourself, so search for ready ones for example in high voltage safety fuses and other high voltage components containing ceramic parts. Purpose of wire is to produce much heat then current passes through so it must have high electric resistance, weakly dependent from temperature (this will allow better regulation of heat flow by changing current) and be highly corrosion resistant to air oxygen at high temperature. Usual material witch satisfies this requirements is nichrome (80:20 nickel/chromium alloy), allowed working temperature of such alloy is dependent from wire diameter and is approximately 1000C. In my furnace i've used muffle tube made from zirconium oxide bases ceramics, with 9 cm lenth, 6 cm outer diameter and ~4 mm wall thickness. This ceramic muffle is wound with narrow equally space turns of nichrome wire with 0.5 mm diameter. In order to make turns equally spaced, the wire is wound in pair with filament having approximately the same diameter, making this double turns contiguous to each other, after all turns have been wound, filament is carefully removed leaving fine coil with equally spaced turns. Remember to leave some free edges to wire, those will be needed to connect wire to power supply. My coil with 81 Ohm electric resistance is shown in photo section below.

Calculation of power parameters. Now then we have heating element, we can measure resulted wire resistance and use it to calculate working power parameters. This moment is very important since if we allow too strong current to the wire it will burn out, if current will be too low we will not get enough heat to reach high temperature. Heat release in wire is described by Joule–Lenz, according to witch heat flow is proportional to square of current multiplied by wire resistance:

$$P = I^2R = U^2/R$$

Wire of each diameter has certain maximum allowed current and recommended work temperature, both are higher for wire of higher diameter, however it should be remembered that wire of relatively high diameter will also require much more current to produce good heat flow – this will lead to complications with power supply. It's a good idea to use wire of some optimum diameter, for general heating devices this diameter is about 0.4-0.6 mm. Table below shows maximum allowed current and recommended work temperatures for wires of different diameters:

D(mm)	0.17	0.2	0.3	0.4	0.45	0.55	0.65	0.75	0.85	1.0
Imax(A)	1	~1.5	2	~2.66	3	4	5	6	7	~8.5
Tmax(C)		950		1000						1100

My wire was 0.5 mm diameter, and according to table has maximum allowed current of 3.5A and recommended work temperature about 1000C. If current passing the wire will be higher then allowed wire will burn out, while values close to this value will lead to decrease of wire durability, so this is a good idea to use current slightly below allowed maximum – for example 0.8 of maximum allowed current, for my wire this limit current will be 3.5*0.8 = 2.8A. Now then we determined maximum work current we can use this value along with wire resistance to calculate maximum work voltage, and substitute resulted value to Joule–Lenz equation to calculate maximum heat power:

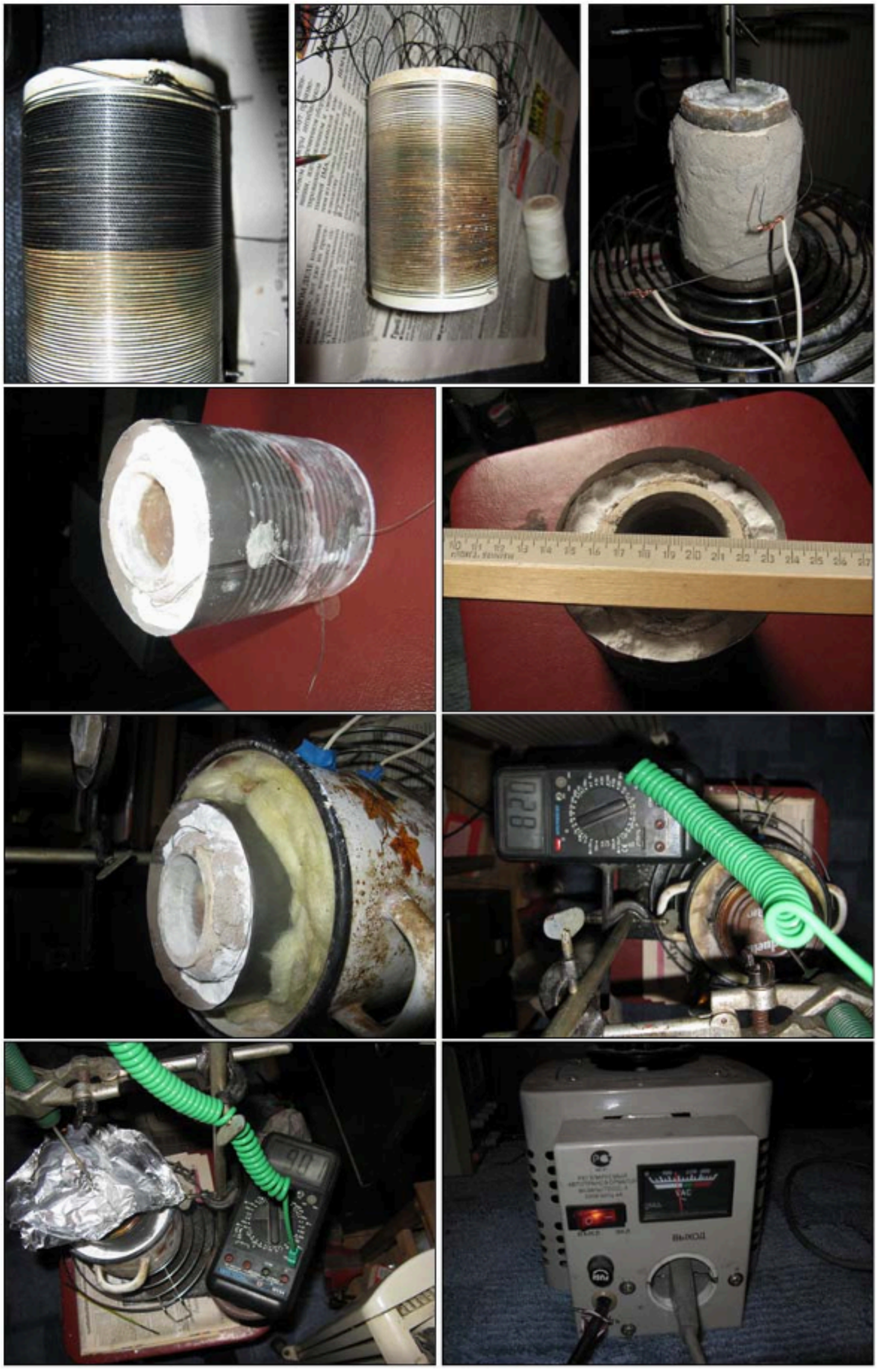
$$U_{max} = I_{max} * R_{wire} = 2.8 * 81 = 226.8 \text{ V}$$
$$P_{max} = U_{max}^2/R_{wire} = (226.8^2)/81 = 0.635 \text{ KW}$$

Muffle coating. Now then our heating element is ready we must provide if with coating. Coating is essential not only to fix wire in place, but also to insure most part of heat flow will be directed to inside of muffle. To do this we must coat our heating element with 0.5-1cm layer of fireclay, I've used layer with approximately ~0.7 mm thick. Take some fire clay and add the least water needed to reach plasticity and cover wire with a clay layer, then the wire is covered and the clay layer is smoothed by rolling on a smooth surface. The whole device is placed into a kitchen oven to dry for 2 hours at ~250C. When initial drying is finished, attach contacts of nichrome wire to power supply and heat it slowly rising voltage to nominal and allow element to sit at this voltage for a while (0.5-1 hour) to complete dry clay layer. Same clay mass is used to make top and bottom caps for the muffle, however this does not require so careful tempering and can be used after 1-2 hours of drying in kitchen oven.

Furnace body. To make whole element more comfortable to work and make it more durable it is placed to the iron can of appropriate diameter, witch is supplied by two drilled holes for wire outlets. Remember to electrically isolate such holes, because if this not done it will lead to short circuit through the iron can body. Bottom of the can is filled with moderately thin layer of magnesium oxide, clay bottom cap is placed to the center. Heating element is placed axially to the can body on the top of the bottom cap and whole space between walls of can and heating element coating is filled with powdered magnesium oxide. This layer of magnesium oxide forms primary heat shield for the furnace, while iron can ensures integrity of furnace in case of coating cracks (this is usually the case if furnace completed several heating/cooling cycles, and appears to be unavoidable while using commonly available materials for muffle coating). Don't forget to supply furnace with top clay and iron can caps, to prevent heat loss through the top of the furnace, those can be provided with hole drilled in the center – for thermocouple temperature control. For my furnace i've use iron can from conservated food with 10 cm diameter and height of 12 cm.

Additional Heat Shielding. Your furnace is ready to work, however to reach high temperature heat shielding should be extended. This can be achieved by placing element to the center of wider saucepan and fill free space between with wide layer of powdered magnesium oxide. My furnace can was ~10 cm diameter and i've used saucepan with 16 cm width. Now then entire device is assembled, you can provide it with thermocouple and connect it to the suitable AC power supply. I've used a laboratory auto transformer (0-220V AC), with maximum secondary coil current of 4A. Assembled device of type I've described was able to reach temperature of 900C in less then 1.5 hour.

Photos:



Step №2. Preparation of calcium cyanamide from urea and calcium oxide.

Properties. Pure calcium cyanamide is a colorless crystalline solid, soluble in water (2.5g in 100 ml of water at 25C) and insoluble in alcohol. It is volatile at high temperatures, sublimes at 1090C (at atmospheric pressure), and can be melted under excessive pressure of nitrogen at 1340C. Dissolved in cold water, it is hydrolyzed forming a soluble acidic salt and calcium hydroxide (eq.1), while hot water decomposes calcium cyanamide with formation of urea and calcium hydroxide (eq.2), and action of water steam at 110-115C causes release of ammonia and formation of calcium carbonate (eq.3). At temperatures above 400C calcium cyanamide is readily oxidized by air (eq. 4).

$$2CaCN_2 + 2H_2O(cold) \rightarrow Ca(CN_2H)_2 + Ca(OH)_2$$
$$CaCN_2 + 3H_2O(hot) \rightarrow Ca(OH)_2 + CO(NH_2)_2$$
$$CaCN_2 + 3H_2O(steam) \rightarrow CaCO_3 + 2NH_3$$
$$2CaCN_2 + 3O_2 \rightarrow CaCO_3 + 2N_2$$

Pure calcium cyanamide contains 34.98% of nitrogen. The industrial product has greyish black color due to contamination by carbon (9-13%), contains 55-65% of pure cyanamide and 18-24% of nitrogen. Additional contaminants (~5%) contain mainly silicic acid, oxides of iron, magnesium and aluminum. In addition industrial calcium cyanamide contains 14-20% of calcium oxide and 2-5% of unreacted calcium carbide. Calcium cyanamide slowly reacts with moisture in the air forming urea, cyanamide, dicyandiamide and ammonia. Calcium cyanamide is used in agriculture as a nitrogen fertilizer. In chemical industry calcium cyanamide was used to produce cyanides, guanidine and a large variety of organic compounds. Calcium cyanamide is toxic and acts mainly as a skin and lung irritant. Toxicity is relatively low but can be raised greatly then combined with alcohol. Action of cyanamide dust followed by alcohol drinks cause severe poisoning accompanied by agonising suffocation. This specific toxic effect is reason why cyanamide solutions are proposed for use in anti alcoholism drugs.

Preparation. Calcium cyanamide is produced on an industrial scale by fixation of atmospheric nitrogen by calcium carbide at temperatures above 1000C in electric furnaces:

$$CaC_2 + N_2 \rightarrow CaCN_2 + C$$

Other methods of preparation include: action of ammonia on cyanogen chloride, melting of urea with metallic sodium, high temperature reaction of hydrocyanic acid with calcium oxide and thermal decomposition of calcium cyanate. It is clear that only last one is possible in home scale since calcium cyanurate can be readily produced by melting urea with calcium oxide or hydroxide, but this method require some work to gain access to high temperature. The process consists of two main stages – in the first stage is formation of calcium cyanate by melting urea with calcium oxide. Thermal decomposition of urea is not a simple process and can produce wide variety of products, depending from reaction conditions and timing, but in presence of alkali it goes almost exclusively to cyanate direction. Mechanism of cyanate formation can be expressed by the following reactions:

1. $3CO(NH_2)_2 \rightarrow 3HOCN + NH_3$
2. $CaO + 2HOCN \rightarrow Ca(OCN)_2 + H_2O$
3. $HOCN + H_2O \rightarrow CO_2 + NH_3$

As one can see, theory requires 3 moles of urea for 1 mole of calcium oxide, since one molecule of cyanic acid is decomposed by water liberated in neutralization of calcium oxide. Reaction takes place at temperatures above urea melting point (120 - 350C) and causes formation lots of ammonia gas, accompanied by intensive foaming of the melted mixture. When the process is nearing completion the reaction mixture re-solidifies due to formation of calcium cyanate which have higher melting point (decompose without melting at higher temperatures). In order to produce calcium cyanamide, calcium cyanate produced is cooled, grounded in mortar and calcined at high temperature in absence of air oxygen. The second stage (calcination of calcium cyanate) proceeds at temperatures about 700-900C, producing calcium cyanamide and carbon dioxide (Eq.1 below). It should be noted that that air oxygen oxidizes produced cyanamide to carbonate (Eq.2 below), and process should be carried out with very limited air contact or under protective gas atmosphere:

1. $Ca(OCN)_2 \rightarrow CaNCN + CO_2$
2. $2CaCN_2 + 3O_2 \rightarrow CaCO3 + 2N_2$

Procedure. Preparation of calcium cyanamide was performed according to US patent 5753199. Prepare a mixture of 56.4g (1 mol) of pure finely ground calcium oxide (Note №1) and 180g (3 mol) of pure fine urea. Mixture is placed to saucepan and heated on a hotplate. As soon as the urea melts the reaction starts, a lot of ammonia is evolved and mixture begin to foam (Note №2). After foaming subsides, mixture begins to solidify and became unstirable. Then reaction mixture is completely solidified, heat source is turned off and still hot product is grounded to fine powder. This yields about 134g of crude calcium cyanate (Note №3). Calcium cyanate is then placed to ceramic crucible, witch is covered by closely fit clay lid, placed to electric furnace (also provided with closely fit cover) and is heated up to 750-800C for one hour (Note №4). After this period furnace is turned off and is allowed to cool down, without opening furnace cover. Then temperature in furnace is downed to 150-200C, furnace cover and crucible is removed and placed to cool on the air. Opened crucible is filled with spongy pinkish-white calcium cyanamide, with small (about ¼ of crucible) bottom layer of product with grey color (Note №5). Total yield is 69.3g of high quality calcium cyanamide (86% from theory), containing almost theoretical amount of nitrogen (~33-34%).

Notes:

1. It is essential to use pure calcium oxide, to prevent presence of alkali metal salts in reaction mixture. Those at first will form corresponding cyanates, witch are unstable at high temperature of second – calcinations stage and will decompose to form cyanide and oxygen. Even if relatively small amounts of sodium or potassium are present, final product can became much more dangerous since on action of acids it will realize extremely dangerous and toxic hydrogen cyanide, in quantities easily detectable by smell from such reacting mixture, or even from solid product itself.

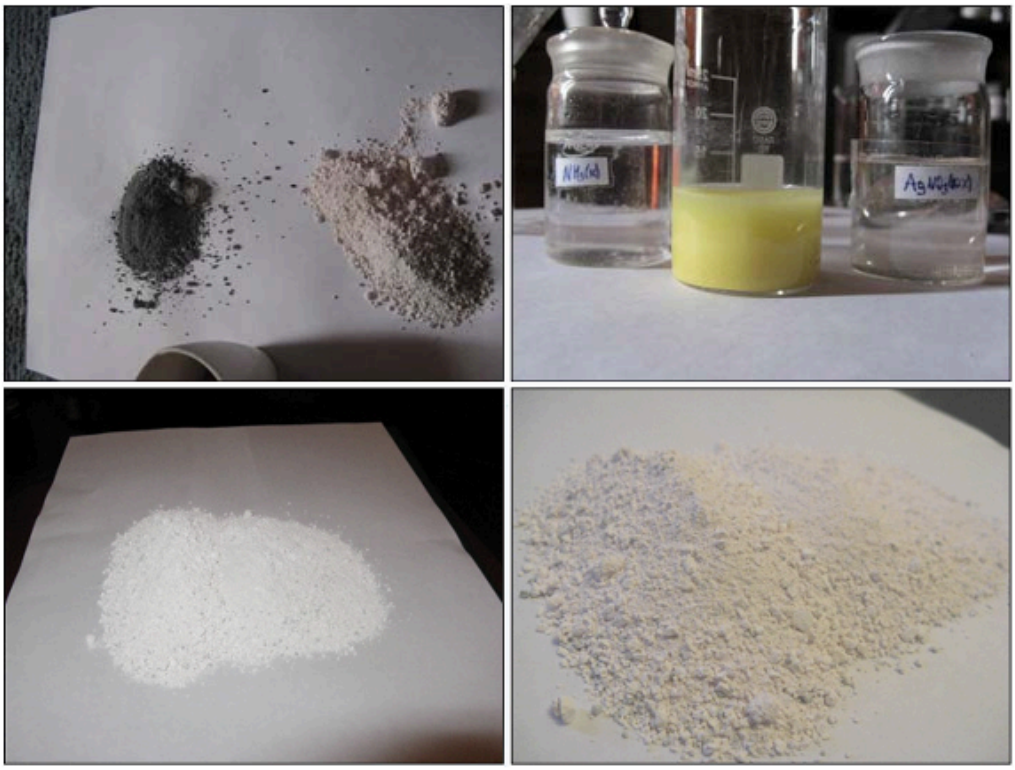
2. Foaming of reaction mixture is very intensive and can easily overflow reactor wessel. This must be taken to account then choosing volume of reactor. Foam can be sufficiently settled down by intensive mixing. Note that moistured source materials will not result in even more intensive foaming but will also reduce overall yield due to increased moisture decomposition of cyanic acid.

3. This quantity is larger then theoretical (134g vs 124g theory), this is result of the fact that solidification and drop of reaction rate occur earlier that source products are completely reacted. It was found that continue of heating after solidification doesn't lead to sufficient change of mass and complete transformation. Analysis of reaction product shown clear strong signal for cyanate, but some small amount of unreacted source products also present. This however is not critical for further calcinations step, since strong heat will cause them to react further, forming final reaction product.

4. Then this crude cyanate is heated up to about 300-400C, impurities of unreacted urea and calcium oxide will react/decompose, forming more ammonia. This additional amount of ammonia evolved is quite small but is easily detectable by smell, so it is advised to perform calcinations in place with good ventilation. Remember to use closely fit lids for both crucible and furnace to prevent oxidation by air, if such lids are used circulation of waste reaction gasses is avoided, allowing them to act as protective atmosphere for main product.

5. Analysis of both colored layers shown that their constituents are exactly the same – both show strong and clear signal for cyanamide with ammoniacal silver nitrate and both contain only tiny traces of cyanate shown by reaction with cobalt salt solution. It appears that grey coloration of bottom layer is caused by charring of some organic impurities present in starting cyanate, and is not related to exact calcination temperature or speed of heating.

1. Photos show reaction mixture on beginning of foaming and at solidification point, grounded reaction product and it's reaction on cyanate using cobalt salts.



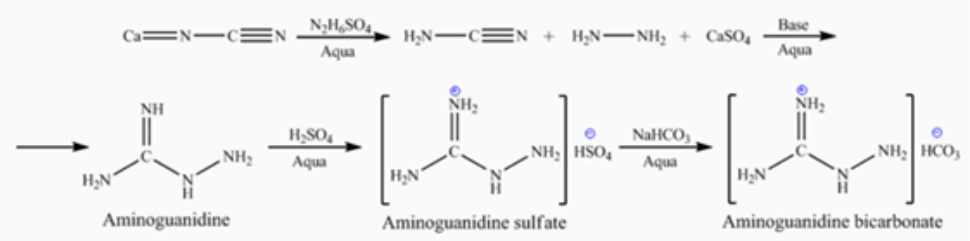
2. Photos below shows two layers in product received after calcination, reaction of both layer samples on cyanamide using ammoniacal silver nitrate and final product with and without flash.

Step №3. Preparation of aminoguanidine bicarbonate from calcium cyanamide and hydrazine sulphate.

Properties. Aminoguanidine is crystalline compound unstable in free state, perfectly soluble in water and insoluble in alcohol, melting point not determined because heat causes decomposition before melting point. Aminoguanidine shows basic properties and forms stable salts with strong acids via amino group, many from them form yellowish solutions in water. Free aminoguanidine and alkaline solutions of it's salts are unstable to heat and oxidation by air oxygen, oxidized products provide such solutions with intense red coloration.

Derivatives. Aminoguanidine hydrochloride, NH2C(=NH)NHNH2*HCl, can be obtained by gradually adding glacial acetic acid (124 grams) diluted with an equal volume of water, to a mixture of nitroguanidine (208 grams) and zinc-dust (700 grams) which has been previously rubbed to a thick paste with ice and water; during the addition of the acid, which occupies 2-3 minutes, the mixture is constantly stirred, and the temperature kept at 0°C by adding ice. The temperature of the mixture is then allowed to rise slowly to 40-45°C, and, as soon as a portion givers no coloration with soda and a ferrous salt, reduction is at an end; the filtered solution is then mixed with excess of hydrochloric acid, concentrated on the water-bath, taken up with alcohol, and evaporated to dryness; the residue consists of aminoguanidine hydrochloride, guanidine hydrochloride, and a little ammonium chloride, which are separated by means of alcohol. Aminoguanidine hydrochloride crystallizes from dilute alcohol in large, thick prisms, melts at 163°, and is very readily soluble in water, but insoluble in ether. The platinochloride, (CH6N4)2*H2PtCl6, is a yellow substance melting at 145 - 146°C.
The nitrate, NH2C(=NH)NHNH2*HNO3, crystallizes from water in large plates, from alcohol in needles, and melts at 144°C; it is only sparingly soluble (12 parts in 100) in water at 16°C. The sulphate, (CH6N4)2*H2SO4*4H2O, crystallizes in needles, loses its water at 110°C, and melts at 207-208°C with decomposition ; it is very readily soluble in water, but insoluble in alcohol. The acid sulphate, CH6N4*H2SO4, crystallizes from water, in which it is only sparingly soluble, in small, yellow needles. When a solution of the sulphate is treated with the theoretical quantity of barium hydroxide, a solution of aminoguanidine is obtained; this solution gradually turns reddish on exposure to the air, and decomposes, with evolution of ammonia, when evaporated at a moderate temperature; on evaporation under reduced pressure, it yields a reddish, crystalline substance which has an alkaline reaction, and is soluble in alcohol, but insoluble in ether. A compound of the composition (CH5N4)2Cu*2HNO3, is obtained as a violet, crystalline precipitate when a solution of aminoguanidine nitrate is treated with copper nitrate and sodium acetate; it crystallizes in microscopic plates or prisms, and is only very sparingly soluble in cold water, yielding a violet solution; it is decomposed by boiling water with separation of copper, and also by ammonia and nitric acid. The corresponding sulphate, (CH5N4)2Cu*H2SO4, prepared in like manner, is a violet, crystalline, sparingly soluble powder.

Preparation: Preparation of aminoguanidine was carried out on base of procedure described in US Patent 3673253, and is based on condensation of cyano-group in free cyanamide with hydrazine. Reaction of hydrazine sulphate with calcium cyanamide in aqueous media results in formation of insoluble calcium sulphate and liberation of free cyanamide and hydrazine, witch react with each other in basic media forming aminoguanidine. Since cyanamide is quite reactive and can readily form dimeric form – dicyandiamide witch doesn't produce aminoguanidine on reaction with hydrazine, this side reaction leads to decreased yield of final product. Reaction conditions, mixture pH and temperature are controlled in such manner witch allows to overcome this side process. This is achieved by keeping minimal concentration of cyanamide and decreasing pH by addition of sulpuric acid to level keeping conversion to dicyandiamide at minimum while still allowing fast condensation process for cyanamide and hydrazine. Reaction scheme is shown on picture below:



Procedure: 55.8g of monohydrazine sulphate (0.429 mol) and 40g of finely ground calcium cyanamide containing 30% N (~0.5 mol) were simultaneously and uniformly added with vigorous stirring to 200 ml of water at pH value of 9.5 (Note №1). The pH value was regulated by the addition of 50 percent sulfuric acid in an appropriate quantity (Note №2). The reaction temperature was kept at 40C. After reaction mixture had been stirred for 30 minutes at pH 9, the pH value was

adjusted to 7 and the mixture was heated for about 1 hour at 80C at that pH value. After reaction mixture had been cooled to 60C, it was filtered and the filtration residue, consisting essentially of calcium sulfate, was washed with 200 ml of warm water (Note №3). Both the filtrate and water used for washing were collected in a precipitation vessel and were adjusted to a pH value of 6.5 with 50 percent sulfuric acid. 36.9g of sodium bicarbonate were then slowly and uniformly added at 30C as a result of which the aminoguanidine bicarbonate was separated as fine white precipitate. Precipitate is filtered, washed with small amount of cold water and dried. Product is white microcrystalline powder, yield is 49.1g (85% based on hydrazine, Note №4).

Notes:

1. This pH range can be achieved without adding sulfuric acid – by adding components in corresponding rate, however it can also be justified by addition of acid. Addition can be carried out in portions, adding new portion, stirring for 1-2 minutes then adding new one e.t.c. Addition should not produce any gas or significant odor, if such are present – your cyanamide is impure and yield be lowered. Use of cyanamide contaminated with alkali metals on this step will lead to formation of hydrogen cyanide witch will be noticeable by odor, while cyanamide significantly oxidized by air during production (e.g containing carbonate) will form a lot of bubbles of carbon dioxide gas.

2. Total amount of sulfuric acid, consumed during whole reaction process is equivalent to 12-15 ml of concentrated 96% H2SO4. It should be noted that not uniform addition of sulfuric acid will cause high local concentrations of H2SO4 and formation of solid/gases, so if H2SO4 is added by portions for example from syringe, addition must be accompanied by vigorous stirring to prevent loss of reactants.

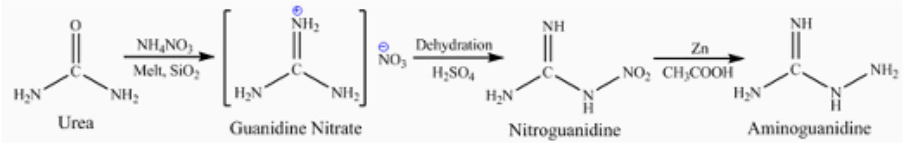
3. Precipitated calcium sulfate consist from particles of relatively large size and filtration proceeds with ease. Total amount of water used for washing is not critical however 200 ml is reasonable amount. One can notice that filtrate obtained has distinctive yellow coloration common for solutions of aminoguanidine salts.

4. Product yield can vary depending on quality of starting cyanamide and from care with witch correct pH ranges are controlled.

1. Left photo shows reagents – calcium cyanamide and hydrazine sulfate used for reaction, second photo is reaction mixture in the middle of reagent addition, third one is heating stage, last photo shows reaction mixture with calcium sulfate precipitate, obtained after heating period.

2. Left photo shows filtration from calcium sulfate, second is filtrate produced –note that this yellow color is common for solutions of aminoguanidine salts, third photo is precipitate of aminoguanidine bicarbonate formed after addition of sodium bicarbonate, last photo is white pure aminoguanidine bicarbonate produced by the process.

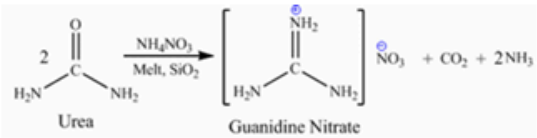
Chapter 2 – Aminoguanidine, nitroguanidine route



Step №1. Synthesis of guanidine nitrate from urea and ammonium nitrate.

Properties. Guanidine nitrate is colorless plates (in presence of impurities yellowish) with density 1.44 g/cm3 and melting point 214.2C. Compound is stable to boiling in water and on melting, decomposition starts only at 270C. Soluble in water (13% at 20C, 32% at 55C and 128% at 90C) and ethanol (11.5% at 78C).

Procedure. Guanidine nitrate can be prepared by reaction of urea with ammonium nitrate in molten state in presence of powdered silica gel catalyst at temperature about 160C. Reaction equation:



Reactor is open 2 liter stainless steel container placed on oil bath heated by hotplate and equipped by mechanical stirrer. Stirrer was made from small 9V motor (from old tape recorder) with shaft made from radio antenna section and stirring arms made from stainless steel, all open surfaces were covered by P.T.F.E lacquer (Note #1). Reactor is filled with 340g of ammonium nitrate (Note #2), 200g urea and 80g of tempered dry silica gel (Note #3) and heated up on oil bath to 195C. Mixture melts and then stirring is applied for total 2 hour sitting period, then another 120g of urea is added and mixture is allowed to sit for 2.5-3 more hours at this temperature (urea can not be added at start in single portion because it will lead to formation of triazine compounds). After and of this period mixture is cooled, mixed with 250 ml of water and boiled, filtered hot to remove silica gel, then material on filter washed with 150 ml of boiling water. Filtrates are combined and cooled to 0C, precipitated guanidine nitrate is filtered and recrystallized from minimal amount of water. Yield is 190-210g of pure recrystallized product (65-70% theoretical).

Hazard note: Process of melting urea with ammonium nitrate is related with explosion hazard, explosion much likely to occur then mixture contain both reagents in zero oxygen balance proportion or if temperature is extended over proposed limit. Described process have been carried out by people from local forums many times without any explosions, however one should consider potential possibility of such then performing this process and take to account all necessary safety precautions.

Notes:

1. Experimentation in performing the process without stirring (mixing was applied only once – then adding second crop of urea), shown that yield is lowered by 2-3%. However stirring is efficient in prevention of local overheat, lowering explosion hazard.

2. Using dry reagents is essential to reduce foaming, especially on first stage.

3. Used silica gel was prepared from liquid glass (sodium metasilicate) using the following procedure. Commercially available liquid glass is diluted 2-3 times, then 10-15% sulphuric acid is added. Solution forms non fluid galantine (it is essential that acid should be added in one portion, and solution should thicken, if H2SiO3 precipitate is formed, solutions must be more diluted and mixed more efficiently) witch is placed to the cold freezer for 2 days. On defrost galantine disperses to fine powder, witch is filtered, carefully washed and tempered to dryness. This silica gel was reused in guanidine nitrate process for 7 times, without loosing activity. Regeneration of silica gel was preformed by washing thoroughly with 1 liter of hot water and tempering.

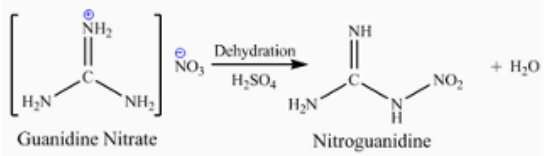
Photo: Reaction vessel and pure guanidine nitrate, made by method described above.

Step №2. Preparation of nitroguanidine by dehydration of guanidine nitrate.

Properties. Nitroguanidine is colorless or slightly yellowish fiber like crystals with monocrystalline density 1.71 g/cm3 and melting point 232C (with decomposition). Nitroguanidine is soluble in common organic solvents, good soluble in water (0.44% at 30C, 7.5% at 100C) and perfectly soluble in alkaline solutions. Heat of formation is -893 kJ/kg, heat of explosion 3220 kJ/kg (liquid water) and 2876 kJ/kg (water – gas), trauzl bomb test gives 305 cm3 expansion, volume of detonation products – 1075 l/kg, oxygen balance -30.7%, 54% mass nitrogen. Nitroguanidine is typical "cold" explosive with low explosion temperature, while explosion workability is slightly higher then TNT. High crystal density and low molecular mass of explosion products results in relatively high detonation velocity (7650 m/s at 1.55 g/cm3, 8200 m/s TMD), so nitroguanidine can be referred as high explosive. Sensitivity to external stimulus is quite low (no detonation on usual impact and friction tests).

Derivatives. The silver derivative, $CH_3N_4O_2Ag$, is precipitated when barium hydroxide is gradually added to a warm aqueous solution containing nitroguanidine and silver nitrate in molecular proportion; it is a colorless compound, almost insoluble in water, but readily soluble in acids, ammonia, and ammonium salts ; it separates from a hot solution of ammonium nitrate in microscopic needles. It turns yellow when treated with alkalis, and darkens on exposure to the air or on prolonged washing with water; it has an alkaline reaction, and explodes when heated. A yellow precipitate, which seems to have the composition $CH_2N_4O_2Ag_2$, is formed when soda or barium hydroxide is added to a solution of nitroguanidine in ammoniacal silver nitrate; it is very hygroscopic, and decomposes very readily when dried at a moderate temperature. The nitrate, $CH_4N_4O_2{*}HNO_3$, crystallizes from hot concentrated nitric acid in nacreous plates, and melts at 147°C. The hydrochloride, $CH_4N4O_2{*}HCI$, crystallizes in plates or prisms.

Procedure. Nitroguanidine can be prepared by dehydration of guanidine nitrate with concentrated sulphuric acid, followed by dilution by water and filtering:



Guanidine Nitrate Nitroguanidine

Aging period depends from temperature, at 40C 5min period is suitable, 30C requires 10 min and 20C require 30 min of aging. Dehydration uses 2.5-3 times mass quantity of concentrated H2SO4. 500g of 93-95 sulphuric acid is placed on water/ice bath and cooled to 10C, then guanidine nitrate (˜200g) is added by portions with stirring (˜5-10g at a time) in such rate that at the end of addition temperature should reach 30C (temperature rises relatively slowly, but cooling is still required), then mixture is aged for 10 minutes and poured into 300g of water/ice mixture. Fine precipitate of nitroguanidine is filtered, washed with strongly diluted water solution of ammonia, with cold water and finally with alcohol. Yield is about 142g (85% theory).

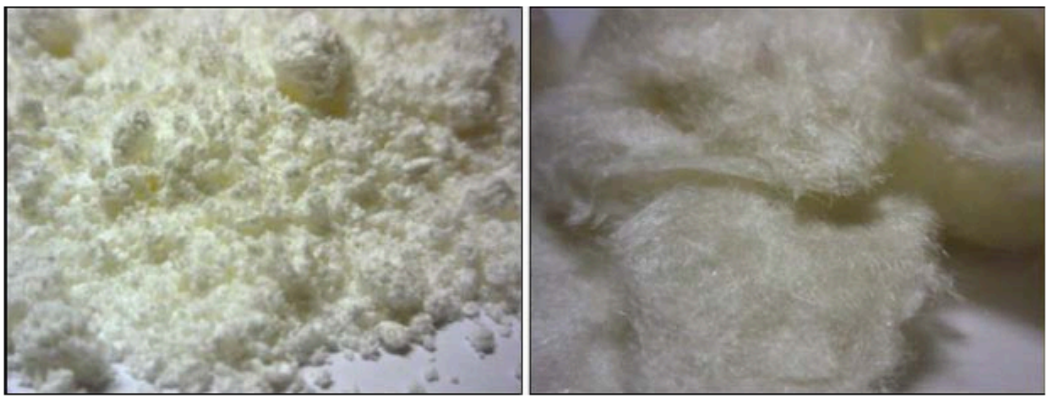
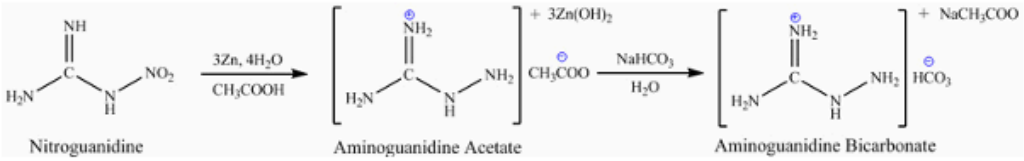


Photo: Crude nitroguanidine made by method above and product recrystallized from water.

Step №3. Synthesis of aminoguanidine by reduction of nitroguanidine with zinc in acetic acid.

Properties. Properties of aminoguanidine and some simple derivatives vere described in corresponding part of previous chapter and here are omitted.

Procedure. Aminoguanidine can be prepared by many routes, for example by action of hydrazine on cyanamide or methylisothiourea and by reduction of nitroguanidine by hydrogen. Probably the best practical method of reduction is reduction of nitroguanidine by zinc dust in acetic acid, since it does not require additional catalysts and is very simple. This method offers 15.6g of aminoguanidine-bicarbonate from per 20g of nitroguanidine (60% from theory):



20g (0.19 mol) of nitroguanidine, 68g (1.04 mol) of zinc dust and 6 ml water are mixed in mortar and rubbed to thick paste. Reaction weasel (thin-wall glass) is filled with 12 ml of glacial acetic acid + 12 ml water and placed to ice/water bath, then cold nitroguanidine/zinc paste is added in small portions with gentle stirring (Note №1). Addition rate is adjusted to hold reaction temperature within 5-15C, care should be taken not to allow temperature to rise to 35C even for a single moment. If mixture becomes too thick or temperature rise to rapidly pieces of ice are added (total 90g). Paste addition takes about 3-4 hours, after this reaction mixture is allowed to sit in ice/water bath for 1 more hour, then mixture is removed from bath and is allowed to heat slowly to room temperature, final mixture volume is about 130-140 ml (Note №2). After 1 hour at room temperature mixture is placed on water bath, heated to 25 and stirred for 30 minutes, then to 32-35C and stirred for 30 more minutes and finally heated to 40C and stirred at this temperature for 15 minutes (Note №3). Then reduction is complete solution is immediately filtered on vacuum funnel, taking effort to filter solid product to dryness (note #4). Solid is washed with 90 ml of water, filtered and discarded, filtrates are combined, 18.5g of ammonium chloride is added, and mixture is stirred until all ammonium chloride is dissolved (note #5), and on continuous stirring 20.2g of soda is dissolved in reaction mixture. Several minutes from addition aminoguanidine-bicarbonate starts to precipitate. Mixture is placed to cold place and allowed to stand for one night, and precipitated aminoguanidine bicarbonate is filtered, washed with ethanol and dried. Yield is 15.6g (60% theory) of aminoguanidine bicarbonate in form of dense white powder, melting with decomposition at 172C.

Notes:

1. Addition of several first crops of paste is accompanied by vigorous reaction and strong heating. On addition of later portions of paste reaction begins to cool down, and strong heating is slowly ceased. Then reaction becomes calmer larger portions of paste could be added, while taking care to not allow to fast temperature elevation. After addition is near completion reaction slows down and exotherm occurs not permanently, but some time after the addition. If temperature is rising too fast due to inefficient stirring of too thick mixture or if added paste portion was too large it is convenient to add some crushed ice to lower mixture temperature and make stirring easier.

2. To rapid heating of reaction mixture should be avoided, because reaction proceeds faster and becomes exothermic. It should be remembered that aminoguanidine is unstable to heat and to much heat will cause decreased yield of product.

3. Precise timings may be varied from run to run. To determine completion of reduction it is convenient to use qualitive test for nitroguanidine witch is preformed as follows. 3 drops sample of reaction mixture is added to test tube with 5 ml of 10% sodium hydroxide, and 5 ml of fresh saturated solution of Mohr's Salt (Ammonium iron(II) sulfate, or just mixture of $(NH_4)_2SO_4$ + $FeSO_4$ solutions) is added. Red coloration shows presence of unreduced nitroguanidine. If reduction is complete same test results in formation of greenish precipitate without coloration of solution. As soon as test shows complete reduction, reaction mixture should no longer be heated and must be filtered as soon as possible.

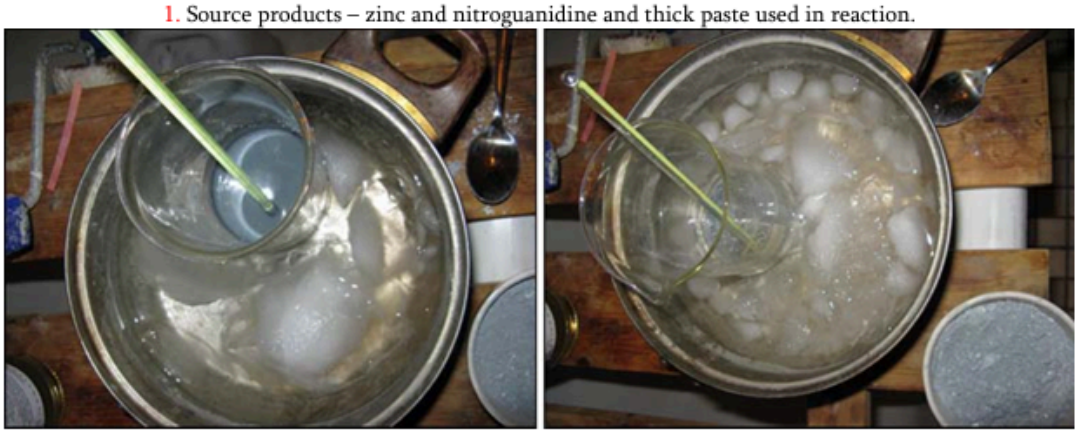
4. Reaction mixture is quite thick and filters not readily. To force filtering to dryness, solid on filter should be trampled down with spoon in effort to fill all cracks forming while solid changes volume to prevent easy entry of air through the

filter funnel. Good filtered solid should be almost dry. Filtering after later washing of precipitate goes without any difficulties.

5. Presence of ammonium chloride prevents joint precipitation of zinc salts then sodium hydrocarbonate is added to precipitate aminoguanidine as weak soluble bicarbonate. If on this stage solution is not transparent it should be filtered. Ammonium compounds transform zinc salts to soluble ammoniacal complexes, allowing to precipitate pure aminoguanidine bicarbonate.

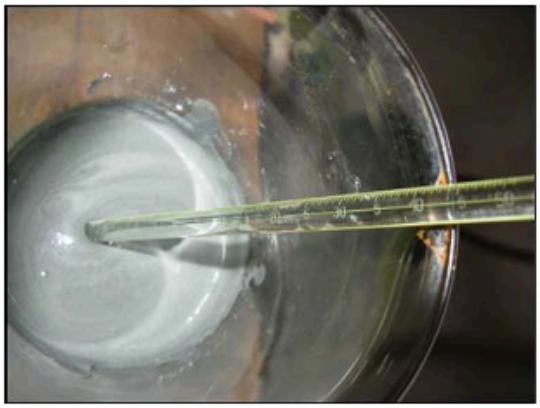
Photos:

1. Source products – zinc and nitroguanidine and thick paste used in reaction.



2. At beginning of addition reaction mixture tend to heat vigorously, so temperature should be controlled carefully. During this period paste should be added in small portions with efficient stirring, fortunately thickness of mixture is still low so this could be done with relative ease.

3. While new portions of paste are added, mixture becomes thicker and heat exchange becomes more and more difficult, local overheating is possible. If stirring is not efficient enough temperature difference in some places of mixture can be as high as 10-15C. Stirring and heat exchange can be cured by adding portions of crushed ice.



4. Then paste addition is complete, reaction mixture is allowed to stand at room temperature, giving time for exothermic reaction to finish and heated in water bath as described above. To keep temperature in required interval it is convenient to use hot water stream with temperature 2-3C higher then required.

5. Left photo shows qualitive reaction for nitroguanidine. Then few drop sample of reaction mixture is added to alkaline solution of iron (II) salt or iron-ammonium complexes nitroguanidine forms beautiful red coloration, while aminoguanidine in absence of nitroguanidine forms greenish precipitate shown on right photo.

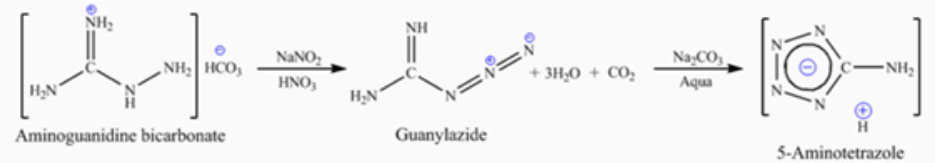
6. Reaction mixture is quite thick and can not be filtered easily, it is highly recommended to use wide vacuum funnel to ease filtering. Filtrate has characteristic yellow color showing presence of aminoguanidine salt and also contains impurities - guanidine and zinc salts.

7. To exclude cooperative precipitation of zinc salts on addition of soda, required amount of ammonium chloride is added in order to bind zinc in soluble zinc-ammonium complexes. After addition of ammonium chloride and soda aminoguanidine bicarbonate begins to precipitate in form of dense white powder.

Chapter 3 – Transformation of aminoguanidine to 5-aminotetrazole

Properties. 5-Aminotetrazole was first prepared by Thiele, by diazotation of aminoguanidine with sodium nitrite in hydrochloric acid environment. 5-Aminotetrazole crystallizes from water solution in the form of the monohydrate, which are colorless prisms or leaflets, losing water above 100°C and melting with decomposition at 200-203°C. 5-Aminotetrazole is badly soluble in alcohol and more readily in ether. It is also soluble in water solutions of bases and strong acids, and has good solubility in hot and poor solubility in cold water. 5-aminotetrazole's heat of combustion is 246.2 kcal/mol, standard enthalpy of formation is -49.7 kcal/mol. 5-Aminotetrazole shows weak acid properties, and in the anhydrous state is extremely hygroscopic. It is stable to heat, and its dissociation constant is about 1*10-4. Besides its acid properties, upon reaction with strong mineral acids 5-aminotetrazole can act as base, as can many organic amines. In general 5-aminotetrazole acts as an amphoteric substance, with behavior similar to that of amino acids. The high chemical stability of the tetrazole ring in addition to fact that substituents on the tetrazole ring are usually entered during ring formation, leaves the amino group as the only reasonable target for chemical manipulations. The amino group of 5-aminotetrazole has all the common properties of that functional group, and can be related in chemical behavior to the amino group of aniline.

5-Aminotetrazole forms salts with metallic cations, some of them are explosive. The cobalt salt $Co(CN_5H_2)_2*H_2O$, exists as pink water soluble crystals which explode upon heating to 228°C. The nickel salt $Ni(CN_5H_2)_2*H_2O$ exists as blue water soluble crystals which explode upon heating at 290°C. The lead salt $Pb(CN_5H_2)_2$, exists as colorless crystals which deflagrate upon heating to 303°C. The mercury salt $Hg(CN_5H_2)_2$ exists as white water insoluble crystals, they explode when dropped on a hot plate heated to 256°C. The Hg salt's shock sensitivity in the lead weight test is 50% explosions using a 2.5 kg weight and 38 cm drop height. The copper salt $Cu(CN_5H_2)_2*H_2O$ exists as green very slightly water soluble crystals. A 2.5 kg weight with an drop height of 68 cm gives 50% of explosions when the copper salt is tested and it deflagrates when heated to 164°C. Aminotetrazole in the presence of copper sulfate and sodium acetate produces a green amorphous precipitate, which can be used as a diagnostic test for aminotetrazole. This precipitate is insoluble in acetic acid, and is soluble in hydrochloric acid.



34g (0.25 mol) of aminoguanidine bicarbonate is added to 217 ml of 15% nitric acid (0.561 mol), and mixed until evolution of carbon dioxide is stopped and resulted aminoguanidine nitrate is fully dissolved in solution. Yellow transparent solution is diazotized by slow addition of 17.2g sodium nitrite (0.25 mol) in 35 ml of water. Addition is accompanied by stirring, and temperature during all addition period is kept between 20-25°C by using water bath if needed (note #1). After completion of reaction the diazotation mixture is allowed to sit for 20 minutes at room temperature, and 29g of sodium carbonate is added (or 46g of sodium bicarbonate). Mixture is then heated on a water bath and refluxed for 4 hours. The solution is then neutralized by 30% sulphuric acid to pH=4, cooled to room temperature and allowed to sit over night (note#2). The precipitated crystals of 5-aminotetrazole monohydrate are filtered, washed with cold water and dried. Yield is about 70-74% based on aminoguanidine.

Notes:

1. Diazotation proceeds smoothly with little exotherm. If reaction mixtures begins to foam (this is the result of decomposition of nitrous acid), mixture must be stirred until form is settled before adding new a portion of nitrite solution. If reaction is carried put in the right way, it takes time about 10-15 minutes and proceeds with negligible evolution of nitrogen oxides.

2. 5-Aminotetrazole has an affinity to form supersaturated solutions. Often it does not begin crystallization even after full cooling, in that case crystallization should be assisted by introduction of a seed crystal, or by rigorous friction of a glass rod on side wall of reaction vessel (below liquid). Crystallization is generally fully complete after 12 hours from start.

Photos: